DESIGN
FOR
INDUSTRIAL ARTS

WOODWORK

JOHN KYLE
HON. A·R·C·A·LONDON

L

B.C.
600
K99
v.1

REFERENCE

415

DISCARDED
FROM
LEGISLATIVE LIBRARY

PROVINCIAL LIBRARY,
VICTORIA, B. C.

DESIGN

FOR

INDUSTRIAL ARTS

JOHN KYLE
Hon. A.R.C.A., London

BOOK I--WOODWORK

Authorized by the Department of Education
for British Columbia

THOMAS NELSON & SONS, LIMITED
TORONTO

PROVINCIAL LIBRARY
VICTORIA, B.C.

B.C.
600
K99
V. 1

Copyright, Canada, 1931
by
THOMAS NELSON & SONS LIMITED

PRINTED IN CANADA

T. H BEST PRINTING CO., LIMITED
TORONTO, ONT.

"Life without Industry is Guilt,
And Industry without Art is Brutality."

—*Ruskin.*

168130

DESIGN FOR INDUSTRIAL ARTS

Book I.—Woodwork.
Book II.—Metal-work.
Book III.—Lettering, Block Printing, etc.

CONTENTS.

PAGE

Preface - - - - - - - - - - 3

A Grammar of Design - - - - - - 7

The Primary Mass—Horizontal and Vertical - 10

The Horizontal Primary Mass - - - - - 18

The Vertical Primary Mass - - - - - 35

Secondary and Subsidiary Masses - - - - 43

Outlines and Contours - - - - - - 49

Greek Contours - - - - - - - - 57

Fretwork or Piercing - - - - - - - 68

Decoration of the Surface with Veiner or Gouge - 75

The Panel - - - - - - - - - 87

Chip Carving - - - - - - - - 96

Wood-turning - - - - - - - - 102

Stained Woodwork - - - - - - - 111

Gesso - - - - - - - - - - 116

Stencilling - - - - - - - - - 127

DESIGN
FOR
STUDENTS OF INDUSTRIAL ARTS
WITH
APPLICATION TO WOODWORK.

PREFACE.

IN the light of present-day educational philosophy the subject of industrial arts has assumed a broader aspect than ever before. Creative thought and motor activities have been brought into close relationship; aesthetic and constructive problems are correlated with each other and the educational worth of industrial arts has been increased, enriched and dignified.

"I believe profoundly," writes J. Howard Whitehouse, Headmaster of Bembridge School, England, "that manual activities—using these words in their widest sense to embrace art and craftmanship—should not be regarded as trivial "extras" or as pastimes for young children, but should be given a place of honour in every school, and should be recognized as definite instruments of noble education.

"Such an ideal has always been in front of us here and so far as we have been enabled in any degree to realize it, this has been without loss to the ordinary academic work common to all public schools. We believe, indeed, that the latter has greatly benefited owing to the larger vision, the keener intellectual spirit introduced into the school by a wider curriculum giving to arts and crafts their proper place."

Attention to thoughtful creative skill in design with due regard to the aesthetic element in constructive work opens up a great vista to the student. To all his creative efforts he may bring a thought content embracing history, geography and scientific study.

The subject of industrial arts includes the history of the human race, and the adaptability of man to his environment; it shows the development of the tools and processes of present-day industries.

In every age and in every country the lives of the people have been guided by principles and the same may be found underlying their constructive efforts. A knowledge of fundamental principles of design forms the basis of all phases of industrial arts and to make this clear to the student this grammar of design has been written.

Professor R. A. Kissack of New York University in an article in the *Industrial Arts Magazine,* March, 1927, refers to the fact that no furniture of American manufacture was found at the Exposition of Industrial and Decorative Arts at Paris, because only modern exhibits of original design were permitted. While American manufacturers were busy making copies of furniture from Jacobean, Elizabethan, Chippendale, Hepplewhite, Adams and other historic styles, they were neglecting to design furniture from fundamental principles, furniture appropriate to the homes and to the lives of Americans.

This fault is not confined to the people of any one country, but each, building on a knowledge of the fundamental principles of design should foster an expression of their own individuality and national characteristics. The rules of design as contained in this book will give the young craftsman in any country a basis on which to build any creative and industrial activity.

The rules are few in number, clearly stated, frequently repeated, and their uniform consistency emphasized in many materials.

"Rules," says Robert Henri, "are only for mechanics," but the rules of industrial design here drawn up are for artisans and craftsmen who wish to develop into robust art lovers. The rules are flexible enough to prevent mechanical and primitive production.

"The arranging or designing part in all kinds of work must be a delightful exercise of skill to all who know the rules," writes Mr. W. R. Lethaby, one of the foremost art craftsmen in the world today. The best players are always those who know and obey rules. Through knowledge, man is enabled to triumph over brute labour and produce beauty. Beauty is thus the expression of man's pleasure in labour.

The problems, both correct and incorrect have nearly all been culled from work done in Junior High Schools and therefore the practicability of the lessons is assured.

The author desires to acknowledge the whole-hearted encouragement and support of some of the technical instructors in formulating this text-book of Design, and wishes to thank Mr. John MacLean, Mr. A. Wishart, Mr. W. J. Williams, and Mr. Harry Jones, for their readiness in providing drawings, photographs, and examples of their students' work.

A GRAMMAR OF DESIGN.

RULE

I. An oblong should have a proportion of subtle dimensions which is difficult for the eye to detect.

II. In dividing a horizontal primary mass into two horizontal subdivisions, one of the spaces should dominate the other in a correct ratio.

III. In dividing a horizontal primary mass into three horizontal subdivisions, one of the spaces should dominate the other two in an artistic ratio.

IV. In dividing a horizontal primary mass into two vertical subdivisions, the spaces should be equal in area and similar in form.

V. In dividing a horizontal primary mass into three vertical subdivisions, the dominant space should be in the centre and the spaces at each side should be equal in area and similar in form.

VI. In dividing a horizontal primary mass into more than three vertical subdivisions, the spaces should be equal in area and similar in form, or arranged in groups.

VII. In dividing a vertical primary mass into two or three horizontal subdivisions, one of the spaces should dominate the other in a correct ratio.

RULE

VIII. In dividing a vertical primary mass into more than three horizontal subdivisions, the spaces should be varied in an agreeable ratio and the wider space should be the lowest.

IX. In dividing a vertical primary mass into two vertical subdivisions, the spaces should be equal in area and similar in form.

X. In dividing a vertical primary mass into three vertical subdivisions, the dominant space should be in the centre and those at each side should be equal in area and similar in form.

XI. In dividing a vertical primary mass into more than three vertical subdivisions, the spaces should be equal in area and similar in form or arranged in groups.

XII. When a secondary mass is added to a primary it must correspond in form and character in order to ensure harmony.

XIII. For outlines and contours the elliptical or oval curves of beauty should be used which are more subtle, refined, and artistic than the circular.

XIV. The border should first have a correct proportion in relation to the panel: decorations should be made by the repetition of varying forms to prevent monotony.

XV. The panel should first have correct proportions, and may be decorated by radiating lines and varying forms which should emphasize and harmonize with the shape of the panel.

RULE
XVI. The shape of the profile or section of a moulding should be the key form used to build up the ornamentation of the moulding.

THE PRIMARY MASS—HORIZONTAL AND VERTICAL.

THE first and main proportion of any project which has to be made is termed by designers, the primary mass, and the relation of height to width of this mass is a matter of primary and ultimate importance, as it determines to a great extent whether or not the appearance of the project will be proportionate and artistic, or ugly and inartistic. Correct decisions in making these measurements are not reached by haphazard methods, but by a knowledge of the laws governing good proportion, a study of correct styles, and familiarity with standards of infallible excellence.

A study of comparison between the square and the oblong may be made with great advantage to the young designer. A square may be mathematically correct in measurement (and right to use under certain conditions) yet its four equal sides cannot, in the nature of things, be as interesting as an oblong having sides offering the possibilities of beautiful adjustment between the lengths of the long and short sides. Nevertheless an oblong may be made to appear less satisfactory than a square because when the shape departs from the exact form of a square, the designer is confronted with subtle problems of proportion.

An oblong, for instance, which is nearly a square, as at B, page 15, so near that there is doubt as to whether or not it has really two pairs of equal sides, is unsatisfactory from an artistic standpoint and the proportion of such an oblong may be classed as inartistic.

An oblong, as at E, page 15, having the long side unmistakably one and a half times the length of the short side, is not so satisfactory as one having a more subtle relationship, such as a proportion of one contrasted to one and three-fifths, or some such relation difficult for the eye to detect. See oblong F, page 15.

Under ordinary conditions the height of an object may be regulated and fixed for the designer by circumstances. The height of a table, for instance, which has to stand in front of a window should have one unalterable measurement controlled by the height of the window-sill from the floor. The width, however, would have to be decided by the designer. Yet the appearance of the table would in a great measure be determined by the relation which the width would bear to the height. The oblong, bounded by the lines of the width and height, would be the primary mass of the table. In like manner the width of a cupboard might be controlled by the width of some recess into which the cupboard had to be placed. The designer, however, would be free to fix the height and would have to be careful to judge correctly in order to make a pleasing and entirely satisfactory proportion.

To assist the designer in successfully making such decisions, it is necessary that he becomes familiar with the principles underlying good and bad proportions and the making of artistic and inartistic forms. He should have a correct standard proportion with which to measure and check his decisions. Such a standard proportion is found in the way described by Fig. G, page 15, and is termed "The Golden Ratio".

Let the given width of a primary mass be represented by 1, 2, to find a height which shall be in the golden ratio to 1, 2, and the proportion of which shall be undoubtedly artistic and satisfactory, draw a line from 2 at right angles to 1, 2, and mark it 2, 3. Bisect 1, 2, at 0 and with 2 as centre and 2, 0 as radius, describe an arc cutting 2, 3, at 5. Draw a line joining points 1 to 5. With 5 as centre and 5, 2 as radius describe an arc cutting 1, 5 at 6, and with 1 as centre and 1, 6 as radius describe an arc 6, 4. Complete the rectangle 1, 2, 3, 4. Distance 1, 6 will be the "Golden Ratio" to 1, 2.

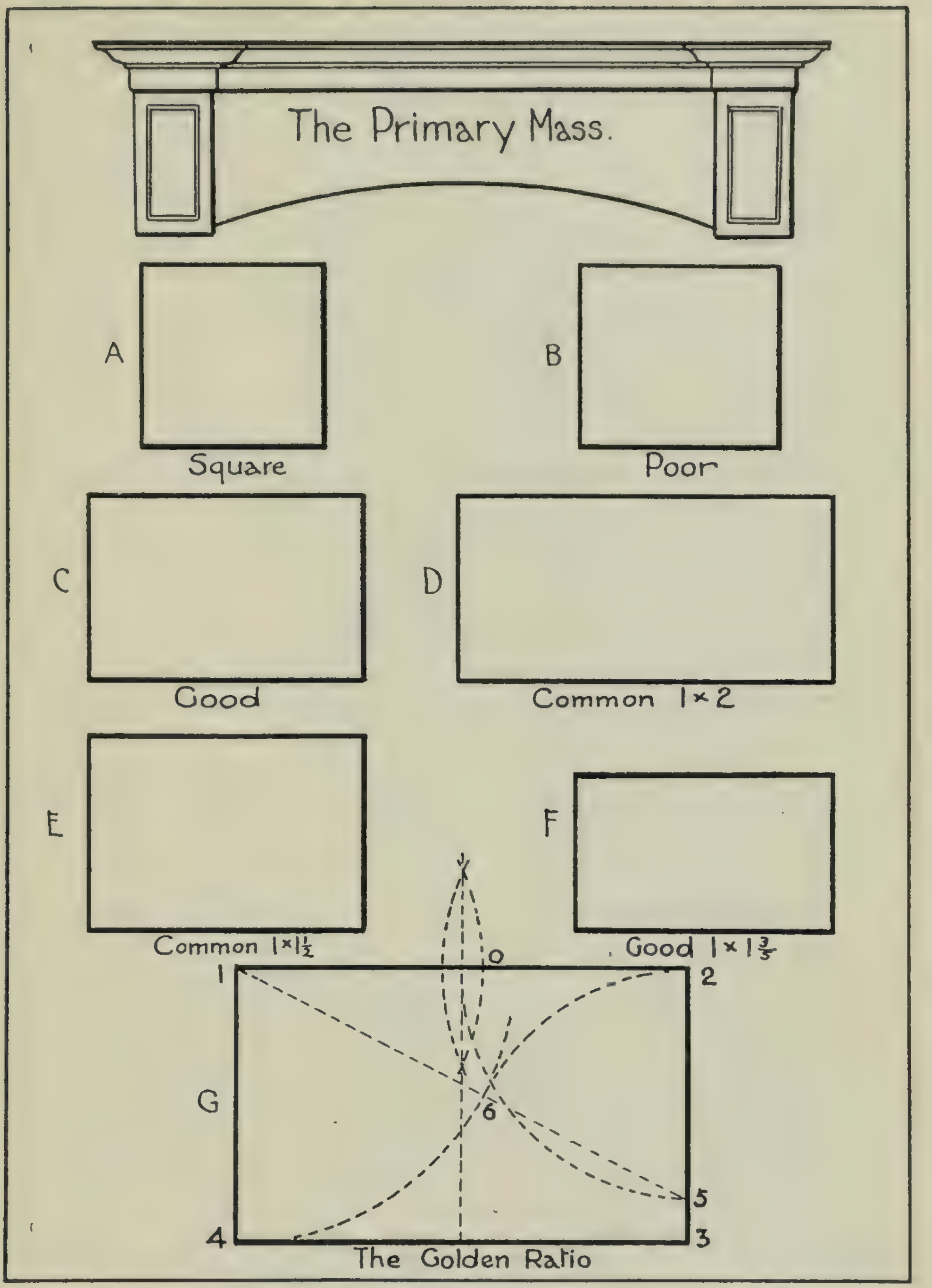
The "Golden Ratio" method may be used as a gauge by which to test other oblongs or rectangles drawn freehand, but it must not be imagined that all oblongs should be made in this exact ratio. There are many satisfactory proportions and as has been already remarked, there is sometimes a measurement in height or width from which the designer cannot depart. A ratio of 1 x 3; 2 x 3; 3 x 5; 5 x 7; or photograph standard measurements 2″ x 3″, 2½″ x 4¼″, and 5″ x 7″ are satisfactory.

Three things are a distinct advantage to handcraft workers, (a) to train the eye to detect relationships which are correct when proven by the "Golden Ratio" standard; (b) to become accustomed to look at masses without allowing details to interfere; (c) to gain the habit of first planning out the primary mass before working out the plan in detail. The rule which may thus be gleaned from this lesson is as follows:—

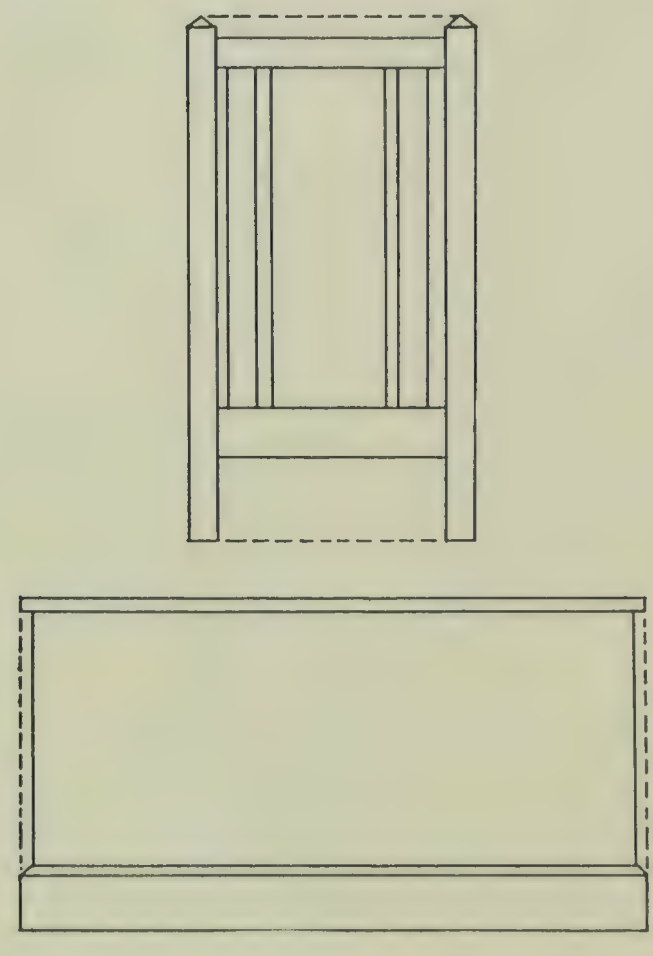
> *Rule I*—An oblong should have a proportion of subtle dimensions which is difficult for the eye to detect.

The primary mass may be called horizontal or vertical according to the direction of its greatest length. Therefore, should the width of the primary mass be greater than its height, the mass should be considered horizontal. On the contrary, if the height of the primary mass is greater than the width, the mass should be considered vertical.

The bath-room mirror on page 17 shows the method which should be adopted in laying out a design for a piece of furniture. It will be seen how important it is to have the main proportions agreeable to the trained eye. No amount of careful workmanship on details can overcome the effect of poor proportions of the primary mass. Details, however, do count in overcoming clumsiness such as may be seen on the cornice mouldings.

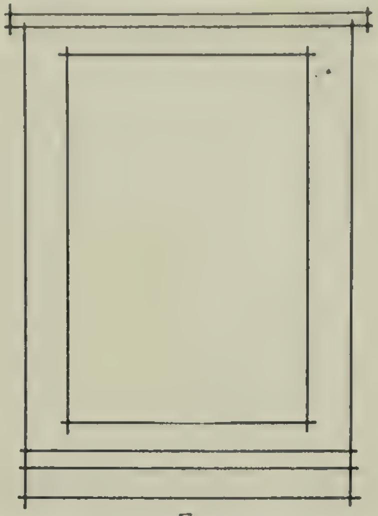

The Primary Mass.
A
Square
B
Poor
C
Good
D
Common 1×2
E
Common 1×1½
F
Good 1×1⅗
G
0
1
2
3
4
5
6
The Golden Ratio

THE PRIMARY MASS-HORIZONTAL AND VERTICAL

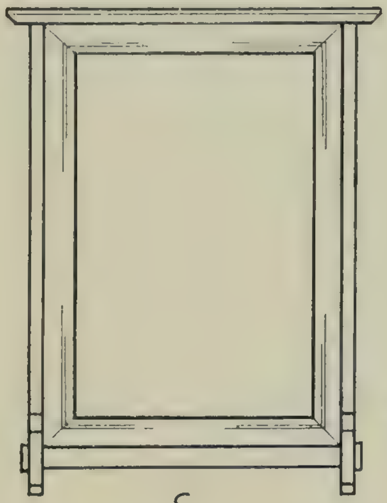


VERTICAL PRIMARY MASS

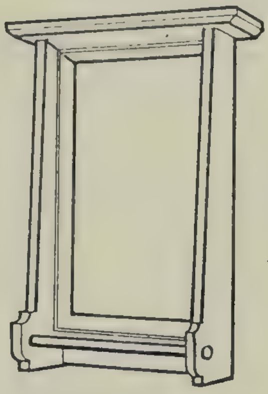
E

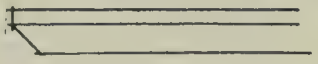


F

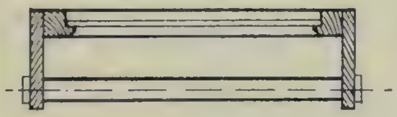


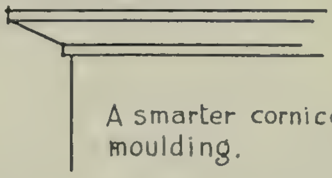
C.





moulding on
bathroom mirror.





A smarter cornice
moulding.

THE HORIZONTAL PRIMARY MASS.

ITS SUBDIVISION INTO TWO HORIZONTAL PARTS.

WHEN the mass is divided by horizontal lines the spaces are called horizontal subdivisions, and in dividing the primary mass into two horizontal subdivisions, the easiest way, and one which costs little thought and no judgment, is to make the two spaces equal in area as at A, page 21. Equal spaces, however, while very common in school, are only artistic under certain well-defined conditions, and this is not one of them. "Beware of equality," wrote Ruskin. "Leave that to children and their card-houses."

It is better, therefore, in dividing a horizontal primary mass into two horizontal parts to make one of the subdivisions dominate the other. At C, page 21, the lower space dominates the top, but at B, page 21, the top space dominates the bottom and both are more artistic in appearance than A. In making such unequal subdivisions the exercise of correct judgment, good taste and sound training are demanded, for the relationship between the two subdivisions may be very artistic or very inartistic. Some assistance in obtaining a good effect may be derived from remembering Rule I which states that an artistic ratio between two lines or spaces is one which is difficult for the eye to detect. Thus the smaller division should not be exactly one-quarter or one-eighth, but some distance between these two.

In deciding upon the simple measurements for the nail box illustrated at G, page 22, the relationship between the length and breadth of the primary mass 1, 2, 3, 4, is of first importance: following that comes the decision of the space I in comparison with H. If the side of the nail box 1, 2, is twelve inches long the problem will be to decide on the full height of the primary mass 2, 3, and the height of the dominant subdivision H.

A similar problem must be attacked in deciding upon the primary mass of the stool. The height may be unalterable but the width will have to be carefully judged. The end view also need not be a common square. If it is not made square, its width must be carefully judged and checked by

> *Rule I*—An oblong should have a ratio which is difficult for the eye to detect.

Ratios of 1 x 3, 2 x 3, 3 x 5, 5 x 7, or photograph standard measurements, 2 x 3, 2½ x 4¼, and 5 x 7 will be found satisfactory. A ratio which is almost a complete square should be avoided. Thus it is that we arrive at the second rule for satisfactory spacing.

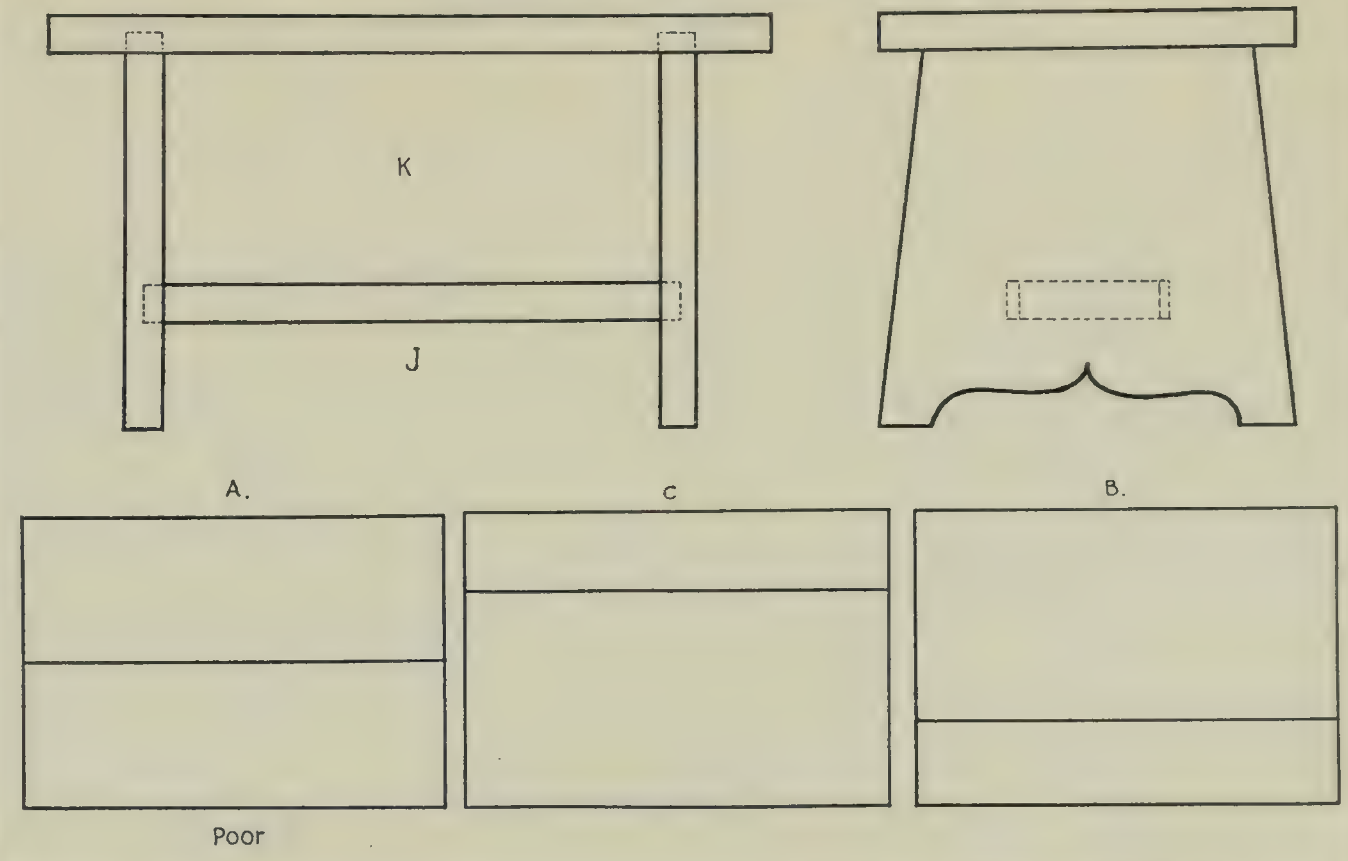
> *Rule II*—In dividing a horizontal primary mass into two horizontal subdivisions, one of the spaces should dominate the other in a correct ratio.

THE HORIZONTAL PRIMARY MASS AND ITS SUBDIVISION INTO THREE HORIZONTAL PARTS.

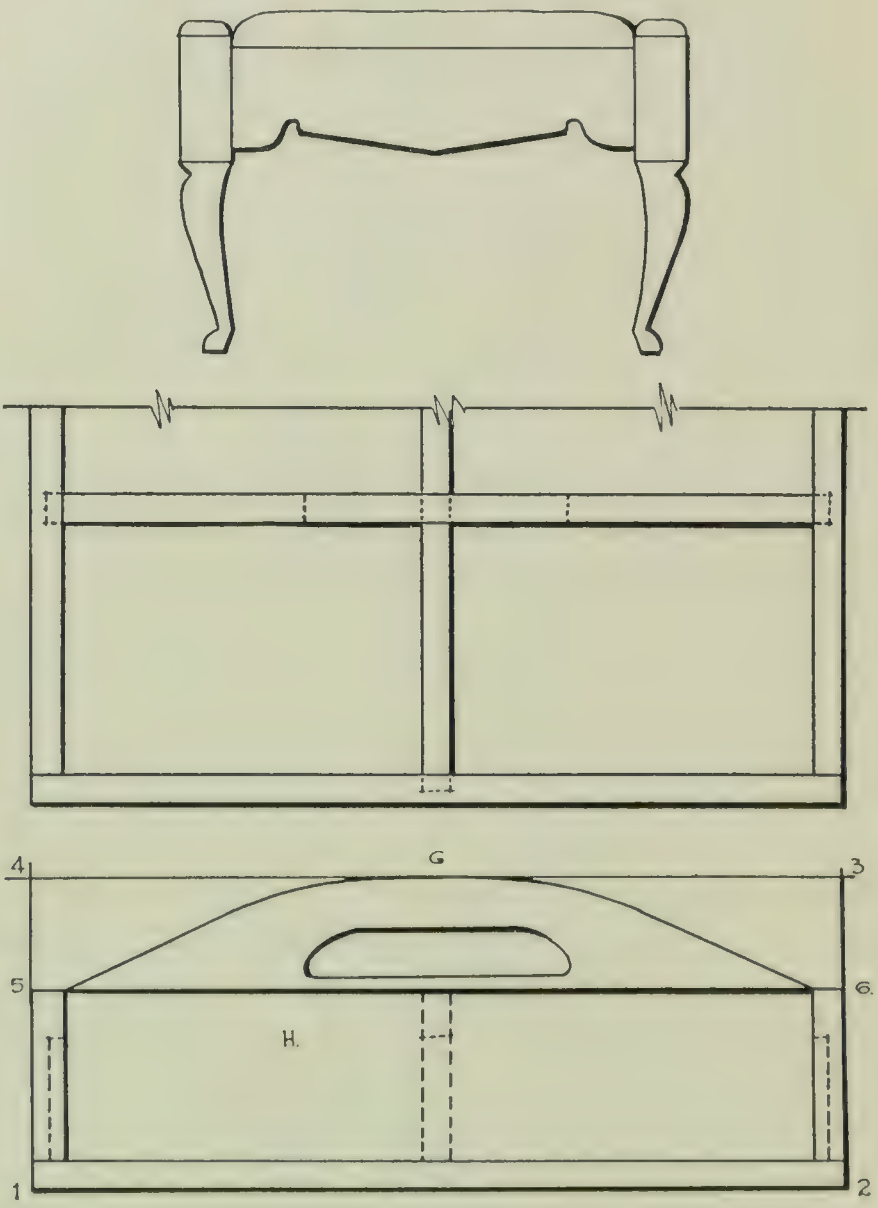
We have seen in the two previous lessons what great care must first be exercised in proportioning the primary mass, and in determining the relationship between height and breadth. We have also seen how carefully the primary mass must be dealt with when dividing it into two horizontal subdivisions. When, however, the primary mass has to be divided into three horizontal subdivisions as at B, D, E, F, page 24, there must be still greater care exercised, for the divisions cannot be made in a haphazard manner and a good effect be assured.

To make divisions equal, as at D for instance, would be clearly unsatisfactory and inartistic, and to space them as at E and F must be decided as a result of trial and experiment. Experienced judgment has determined that one of the spaces should dominate the other two, and the dominating space should be in the middle. Even that statement however, does not decide for us where the two dividing horizontal lines should actually go.

The horizontal primary mass and
its subdivision into two horizontal parts.



The horizontal primary mass and its subdivision into two horizontal parts.



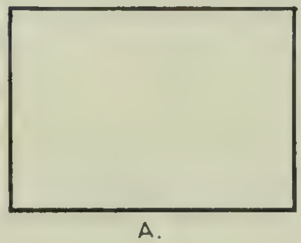
In designing a small stool for example, as seen at C, page 24, the primary mass A should be carefully planned and, if necessary, the width should be checked by the golden ratio to see that Rule I is not violated. All this is simple compared to the further divisions of the primary mass into three horizontal subdivisions as at B. The appearance of the stool will, in a great measure, be affected by the ratio the spaces decided upon bear to one another. Consequently a great many trials should be made and decisions checked by Rules I and II.

From the foregoing the substance for Rule III may be gathered and stated as follows:

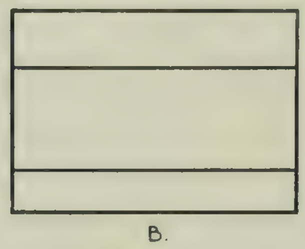
> *Rule III*—In dividing a horizontal mass into three horizontal subdivisions one of the spaces should dominate the other two in an artistic ratio.

The magazine and newspaper stand illustrated at G, page 25, shows a faulty division with two equal horizontal spaces and a narrow subservient space at the bottom. It is easy to see what an improvement would take place if the height of the primary mass were in better relation to the width and not as at present, and if the book-rack were divided into three unequal and harmonious spaces with one space dominant. One may readily understand from the foregoing with what care such decisions should be made and the process of reasoning which should determine such decisions.

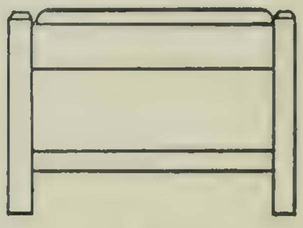
The horizontal primary mass and its subdivision into three Horizontal parts.



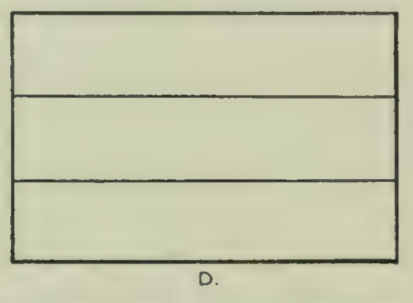
A.



B.

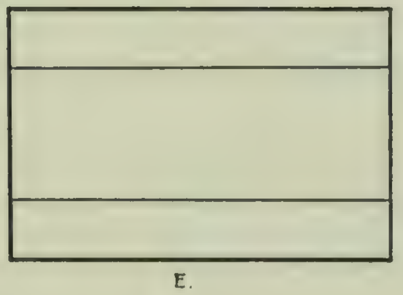


C

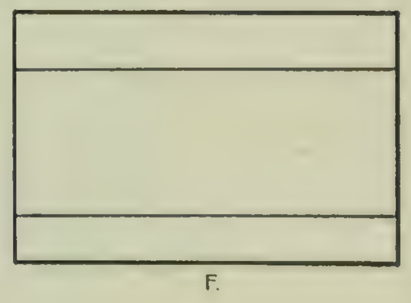


Poor

D.

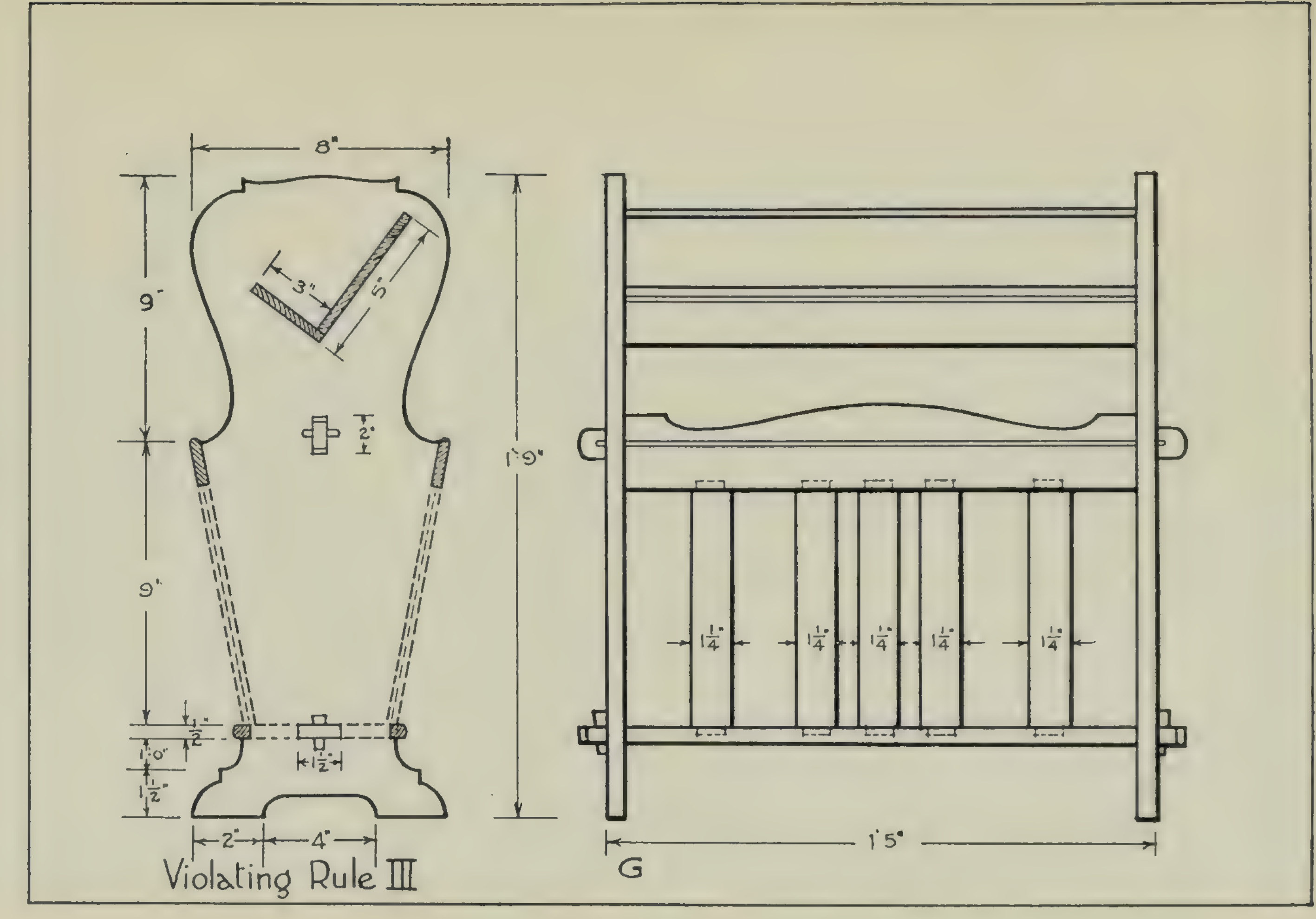


E.



F.

Rule III In dividing a horizontal mass into three horizontal subdivisions one of the spaces should dominate the other two in an artistic ratio.



Violating Rule III

G

THE HORIZONTAL PRIMARY MASS AND ITS SUBDIVISION INTO TWO AND THREE VERTICAL PARTS.

In the previous lessons the horizontal primary mass and its horizontal subdivisions have been dealt with; that is, those spaces which were made by drawing horizontal lines. Consideration should now be given to subdivisions made by vertical lines and which should be consistently known as vertical subdivisions.

If it is required to divide the horizontal primary mass into two vertical subdivisions a symmetrical division making the spaces equal will be found most satisfactory as at A, page 29. This decision, it will be observed, is quite unlike that arrived at when dividing the primary mass into two horizontal subdivisions. It was then found that two equal horizontal subdivisions were decidedly inartistic. From the above statement we thus deduce the next rule:—

> *Rule IV*—In dividing a horizontal primary mass into two vertical subdivisions, the spaces at each side should be equal in area and similar in form.

To divide the horizontal mass A into two equal and symmetrical divisions is a simple process and need cost very little thought or consideration. When, however, a triple subdivision is demanded the judgment of the designer is called into question and the ratio between the spaces must be considered carefully.

The common method of dividing the horizontal primary mass into three equal vertical subdivisions as at B, page 29, would deserve the same censure as that which was given when the horizontal primary mass was divided into three equal horizontal subdivisions.

In making a triple division it will be found more artistic to make one of the subdivisions predominate over the other two, and the satisfactory dominant space should be in the middle as at E, page 30. Therefore, the following rule is laid down, an example of which may be seen in illustrations G and H, pages 30 and 31.

> *Rule V*—In dividing a horizontal primary mass into three vertical subdivisions, the dominant space should be in the centre and the spaces at each side should be equal in area and similar in form.

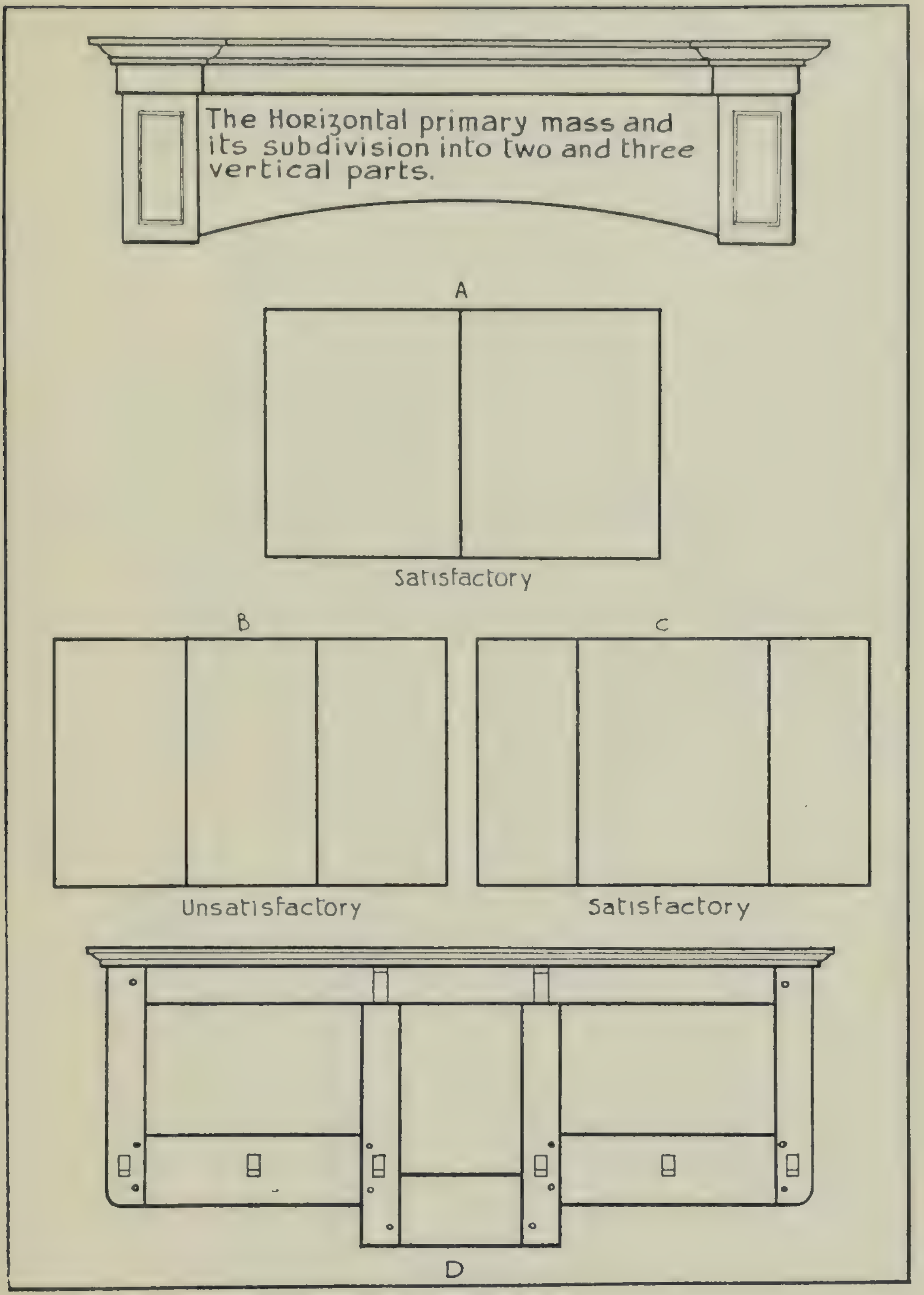
The triple mirror seen at D, page 29, has violated this law by making the central division narrower than those at each side. On comparison with the mirror illustrated at G, page 30, the arrangement looks clumsy and inartistic. The triple mirror at G shows excellent spacing and the process of laying-out the design is one which should be consistently adhered to. "Plan out your work, then work out your plan," is an old adage which should control the method of the designer.

The lay-outs seen at G, H and E, pages 30 and 31, will tend to confirm this statement.

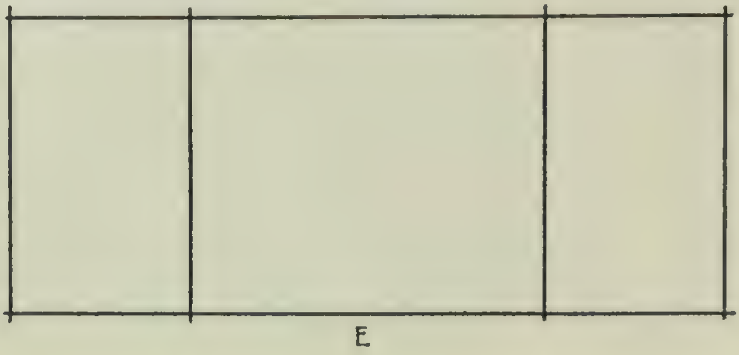
THE HORIZONTAL PRIMARY MASS AND ITS SUB-DIVISION INTO MORE THAN THREE VERTICAL PARTS.

It has already been clearly demonstrated that it was a decided improvement to vary the three vertical divisions rather than have them all of equal width; yet notwithstanding this decision, the spaces may all have equal widths when they number more than three. These statements seem to be conflicting for if three equal divisions show a poverty of conception, how is it possible for more than three not to be otherwise? The fact is, that the greater number impresses one with a desirable feeling of order and rhythm as may be seen at A, page 34. Such regular spacings are seen in panelling and in balustrades.

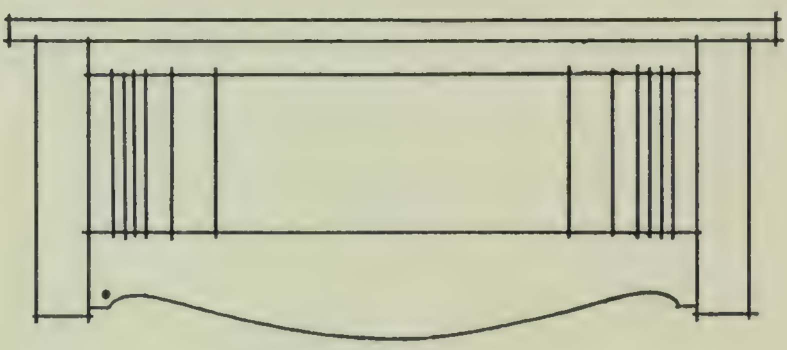
While no exception can be taken to the divisions at A and B, page 34, the varied arrangement and grouping as seen at C is more agreeable. In such cases groups of three, five and seven parts are more satisfactory than groups of two, four and six; in other words odd numbers are preferable to even numbers. The spaces between the panels or up-


The Horizontal primary mass and its subdivision into two and three vertical parts.
A
Satisfactory
B
Unsatisfactory
C
Satisfactory
D

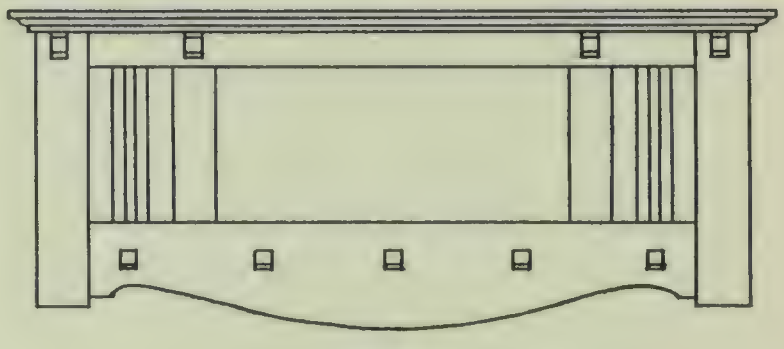
LAY-OUT OF HALL MIRROR



E

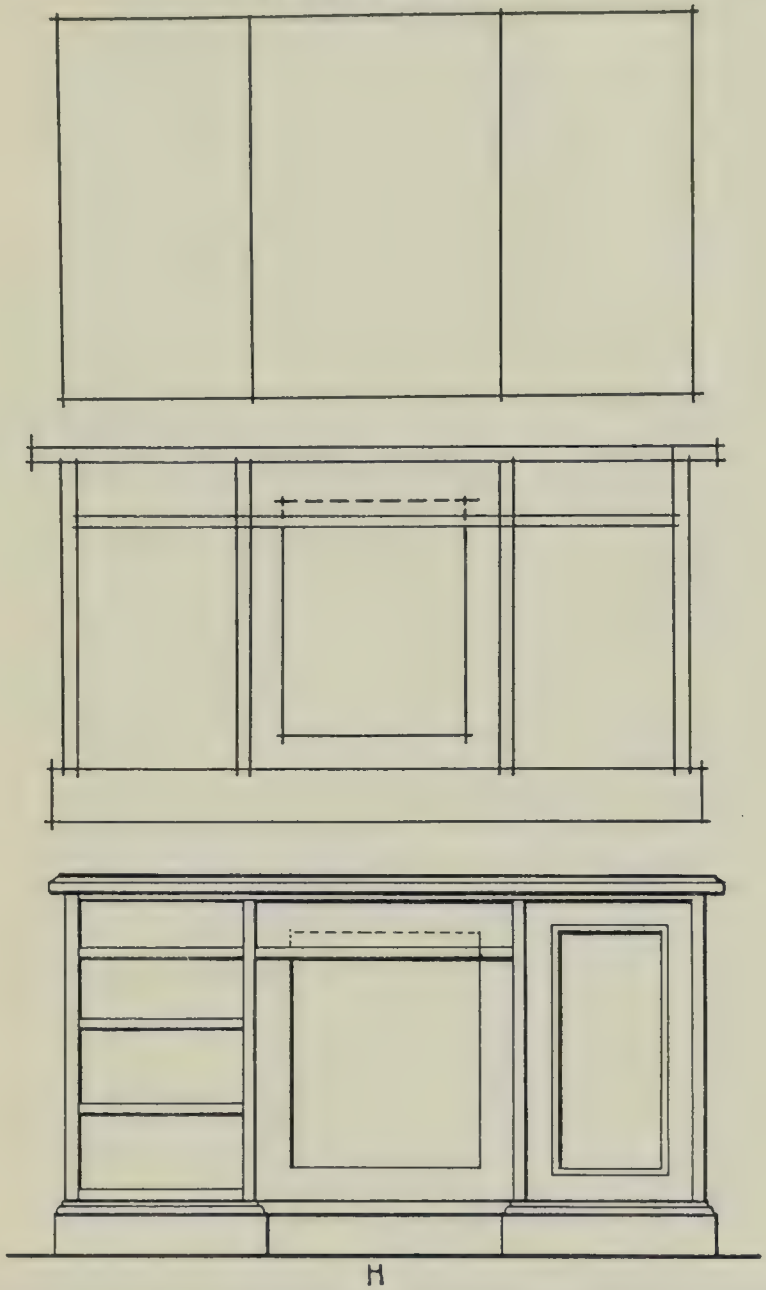


F

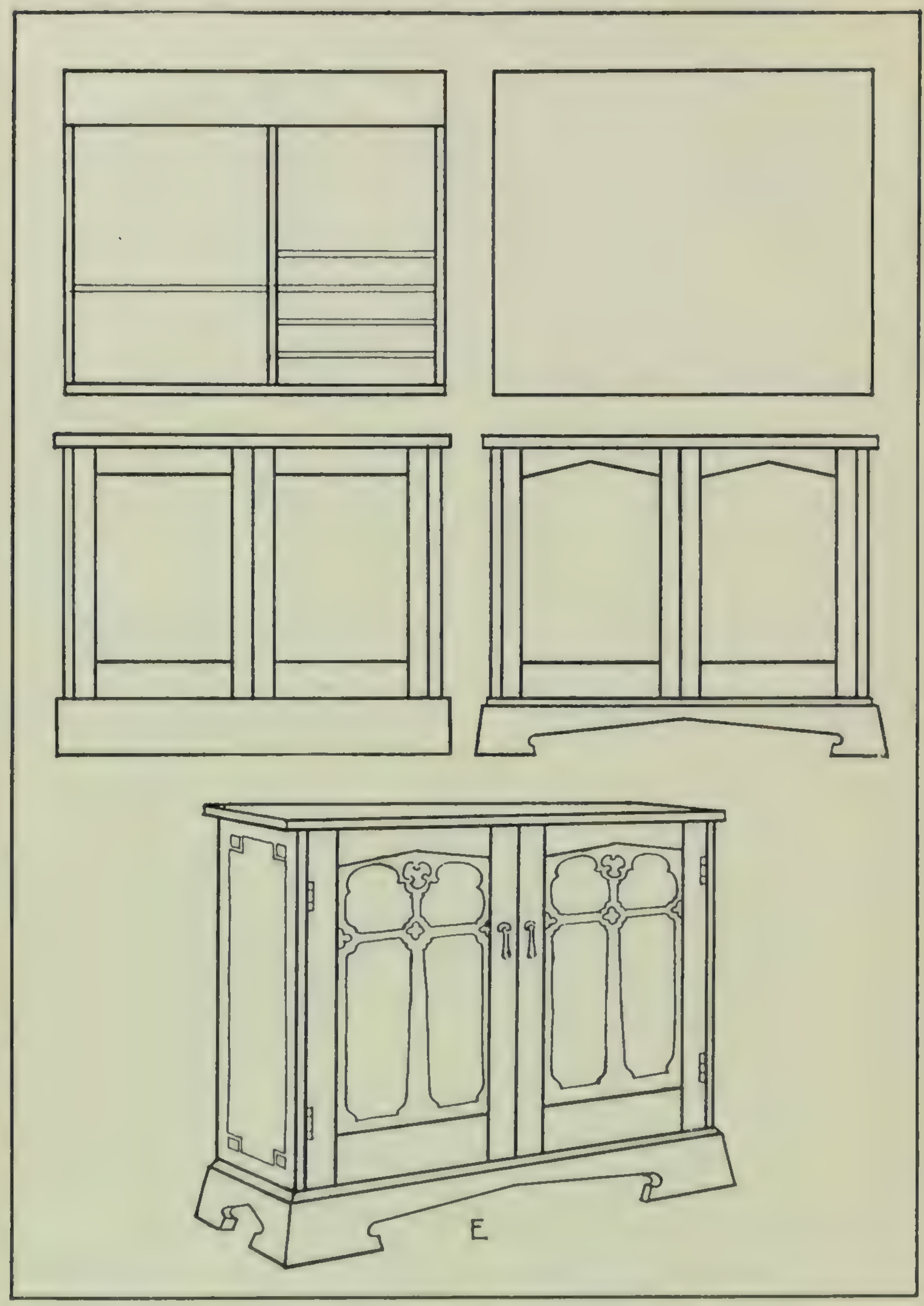


G

THE LAY-OUT



H


E

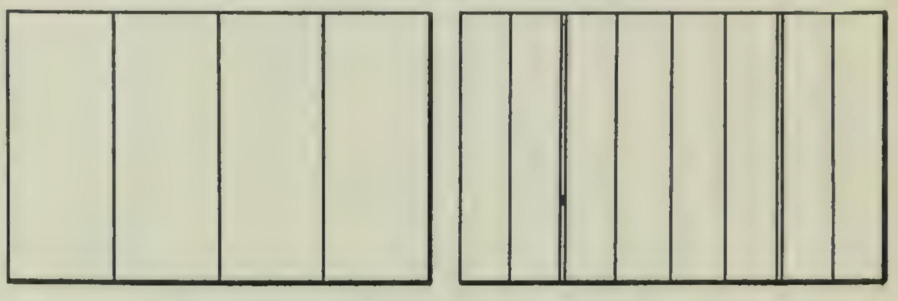
rights must also be carefully chosen. Thus we have the next rule:—

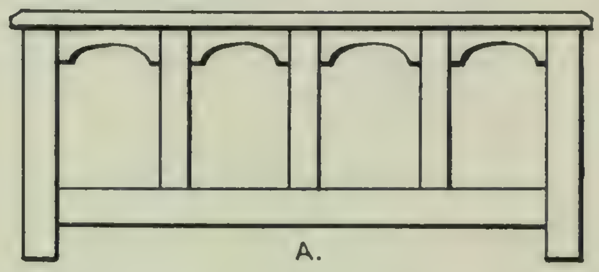
> *Rule VI*—In dividing a horizontal primary mass into more than three vertical subdivisions, the spaces should be equal in area and similar in form or arranged in groups.

There should be a subtle relationship between the widths of spaces and the widths of panels.

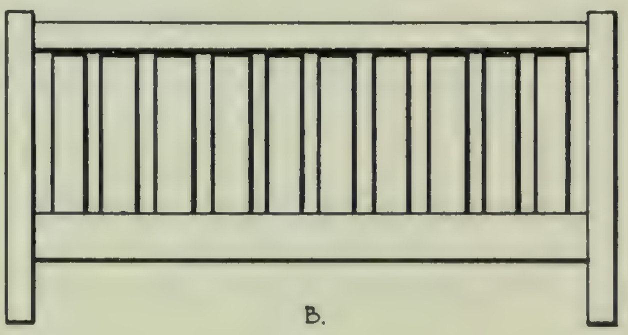
This spacing and proportioning may seem at first sight to be very trivial and even childish. Nevertheless, it is an important factor in designing anything from a small box to a large building; from a photograph frame to a public monument; from a garden-gate to the home itself, and to all that is to be found therein. It may be recognized in the work of the architect where stores are being remodelled and where hotels are being built. Any artistic effect which arrests the attention will, on analysis, be found to owe its distinctiveness to an appreciation of, and obedience to, the fundamental principles of spacing. On the contrary, the unsatisfactory and faulty work which has no appeal to the trained eye, the building which appears to be gradually sinking into the ground or lacks style, and the one which does not seem to command respect will be found to have poor proportions.

The horizontal primary mass and its subdivision into more than three Vertical parts.

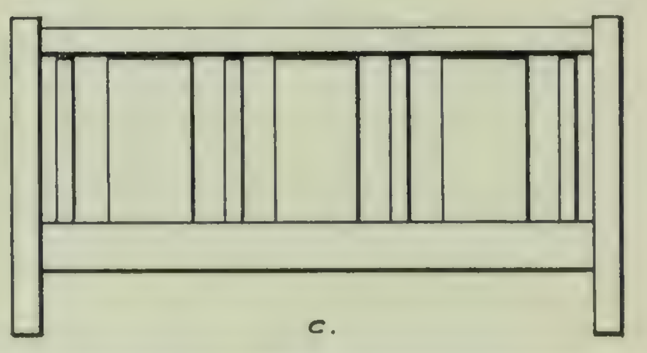




A.



B.



C.

THE VERTICAL PRIMARY MASS.

ITS SUBDIVISION INTO TWO AND THREE HORIZONTAL PARTS.

THE vertical primary mass seen at A, B, C, F, page 37, must be as carefully dealt with as the horizontal primary mass. The ratio of breadth to height should be adjusted with due regard to the avoidance of common errors. The statement made in considering the horizontal primary mass should again be studied because the rules of the one are applicable to the other.

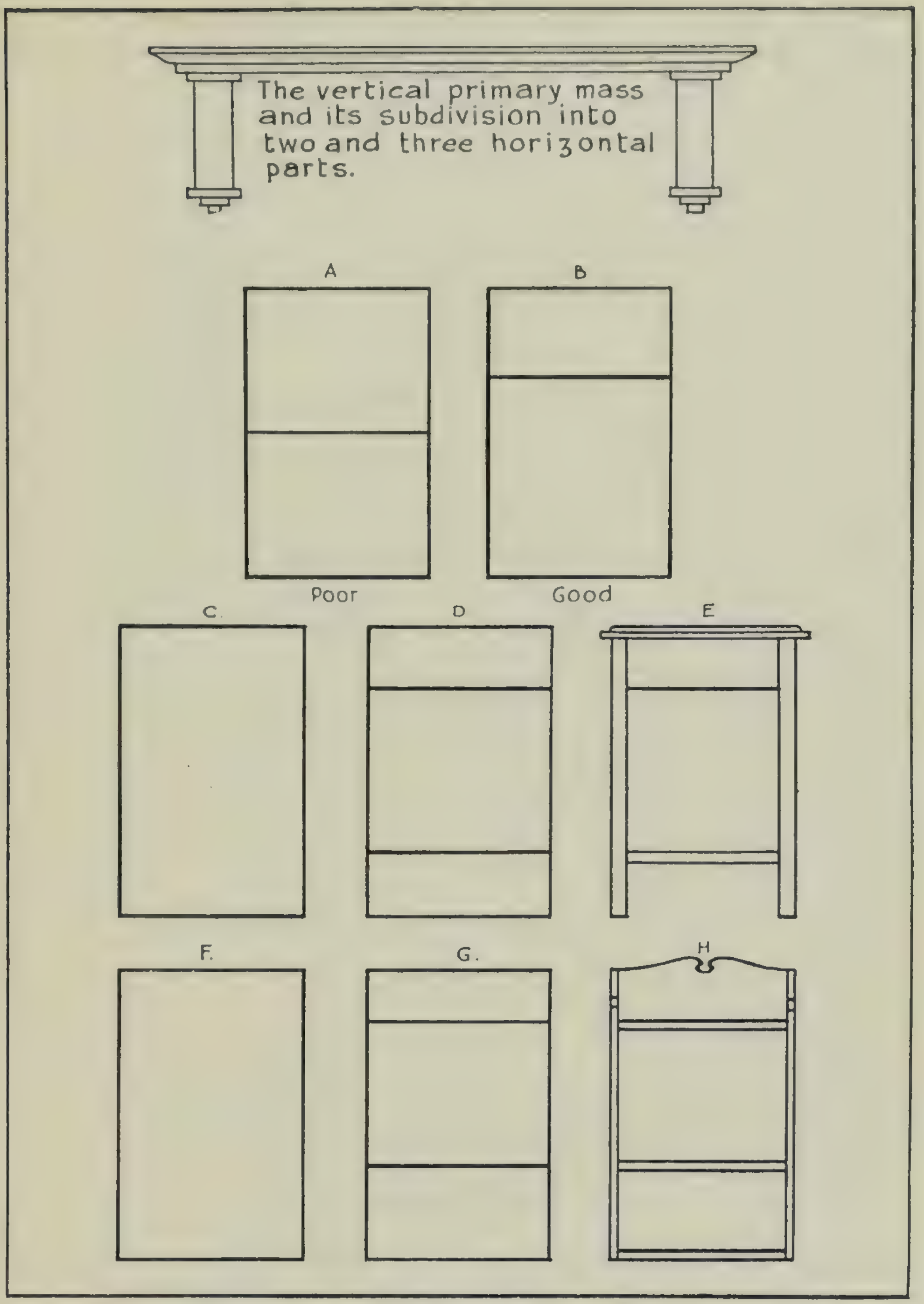
In dividing the vertical primary mass into two horizontal subdivisions the easiest way is to divide it into two equal parts as at A, page 37. Unfortunately this division, while easy, is very inartistic and it is preferable to obey Rule II and allow one space to dominate the other as at B. It should also be remembered that a ratio between the two spaces which is difficult for the eye to detect is most satisfactory. For these reasons a rule for the division of the vertical primary mass may be stated thus:—

Rule VII—In dividing a vertical primary mass into two or three horizontal subdivisions, one of the spaces should dominate the others in a correct ratio.

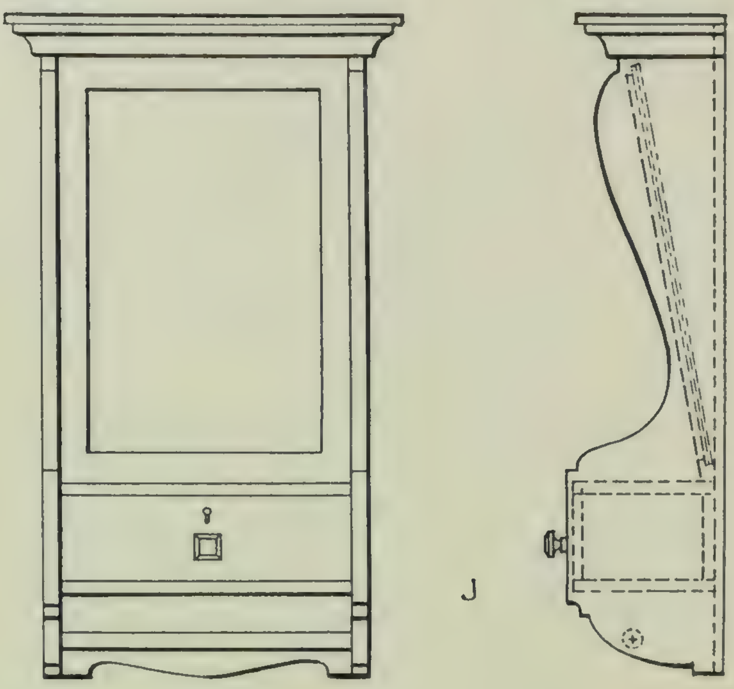
While the division of the vertical primary mass into two horizontal parts of artistic ratio requires care and good judgment, the difficulty is intensified when the vertical mass has to be divided into three horizontal parts. It was found in dividing a horizontal mass into three horizontal divisions that one of the spaces should dominate the other two. Reference to the small table at E, page 37, and to the wall cabinet at H, page 37, will show the effectiveness of this rule. In designing the small table at E the primary mass C was carefully chosen and checked by the golden ratio to see that Rule I was not violated.

This step was simple compared to the further division at D of the primary mass into three horizontal subdivisions. As the appearance of the table is in a great measure affected by the ratio which these spaces bear to each other, many trials had to be made and the final decisions were checked by Rules I and II. In like manner the design for the small wall-cabinet at H was developed.

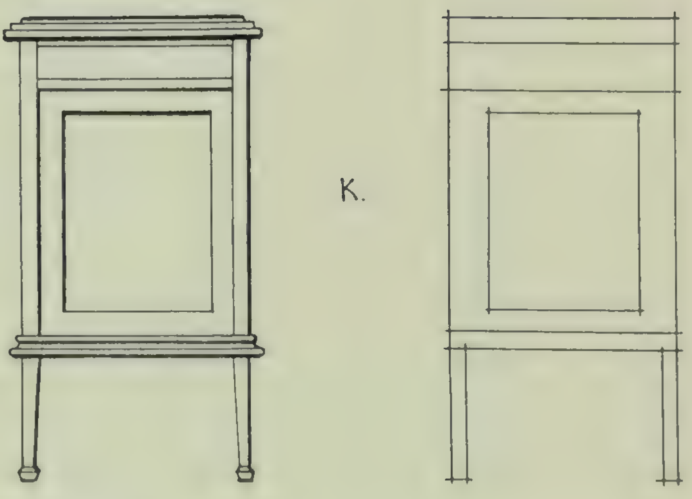
The divisions of the vertical primary masses as found at J and K, page 38, are well chosen. They are the result of careful trials, and a faulty decision would have marred the general effect in a way that could have been detected even by those who knew absolutely nothing about principles of design.



The vertical primary mass and its subdivision into two and three horizontal parts.



J



K.

DIVIDING THE VERTICAL PRIMARY MASS INTO MORE THAN THREE HORIZONTAL SUBDIVISIONS.

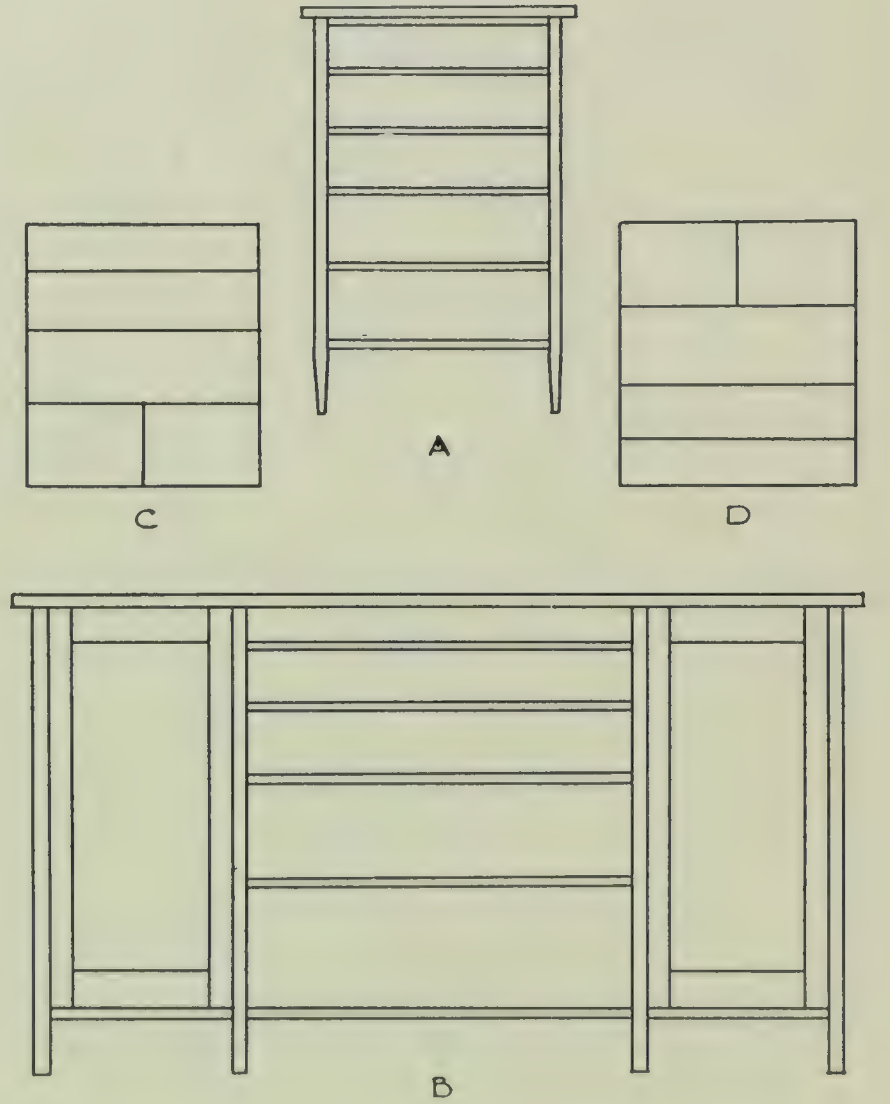
In dividing the vertical primary mass into more than three horizontal subdivisions it will be found necessary, in order to obtain a satisfactory effect, to keep the wider of the subdivisions at the bottom. A study of the illustration at A and B, page 40, and a comparison of figures C and D, will leave no doubt on this point. The problem, however, of deciding on the ratio of the spaces to each other is not easy at first to determine. With practice and knowledge of what to avoid, the eye will be able to decrease the spaces as they go upwards and arrange an orderly rhythmic and subtle gradation. From the foregoing the substance of Rule VIII was gleaned and may be stated thus:—

> *Rule VIII*—In dividing a vertical primary mass into more than three horizontal subdivisions, the spaces should be varied in an agreeable ratio, and the wider space should be the lowest.

THE VERTICAL PRIMARY MASS AND ITS SUBDIVISION INTO TWO, THREE OR MORE THAN THREE VERTICAL PARTS.

The principle of dividing the vertical primary mass into two parts as at A, page 44, is exactly the same as that controlling the division into two

Dividing the vertical primary mass into more than three horizontal subdivisions



vertical parts of the horizontal primary mass. That is, a symmetrical treatment is adopted and the spaces at each side are made equal in area.

Symmetrical divisions give dignity to a design and any departure results in an unsatisfactory feeling of disorder unless the balance is perfected in some exceptionally clever manner. Even when this balance is accomplished the design is usually inclined to be bizarre and undignified. For these reasons the rule is stated as follows:—

> *Rule IX*—In dividing a vertical primary mass into two vertical subdivisions, the spaces should be equal in area and similar in form.

In dividing the vertical mass into three vertical parts, however, equality as at B, page 44, should be avoided in favour of a dominant central part as at C. The adjustment between the side spaces should be carefully made just as was necessary in dividing the horizontal mass into three vertical subdivisions. The following should, therefore, be the rule:—

> *Rule X*—In dividing a vertical primary mass into three vertical subdivisions, the dominant space should be in the centre and those spaces at each side should be equal in area and similar in form.

The division of the vertical primary mass into more than three vertical parts is the same as in dividing the horizontal primary mass into more than three parts. There may be a repetition of similar areas as at D, or the areas may be arranged in groups as at E, groups of three, five and seven being preferable to groups of two, four and six. The next rule should, therefore, read as follows:—

> *Rule XI*—In dividing a vertical primary mass into more than three vertical subdivisions, the spaces should be equal in area and similar in form or arranged in groups.

The book-case on page 45 shows a piece of furniture planned in obedience to laws of proportions.

SECONDARY AND SUBSIDIARY MASSES.

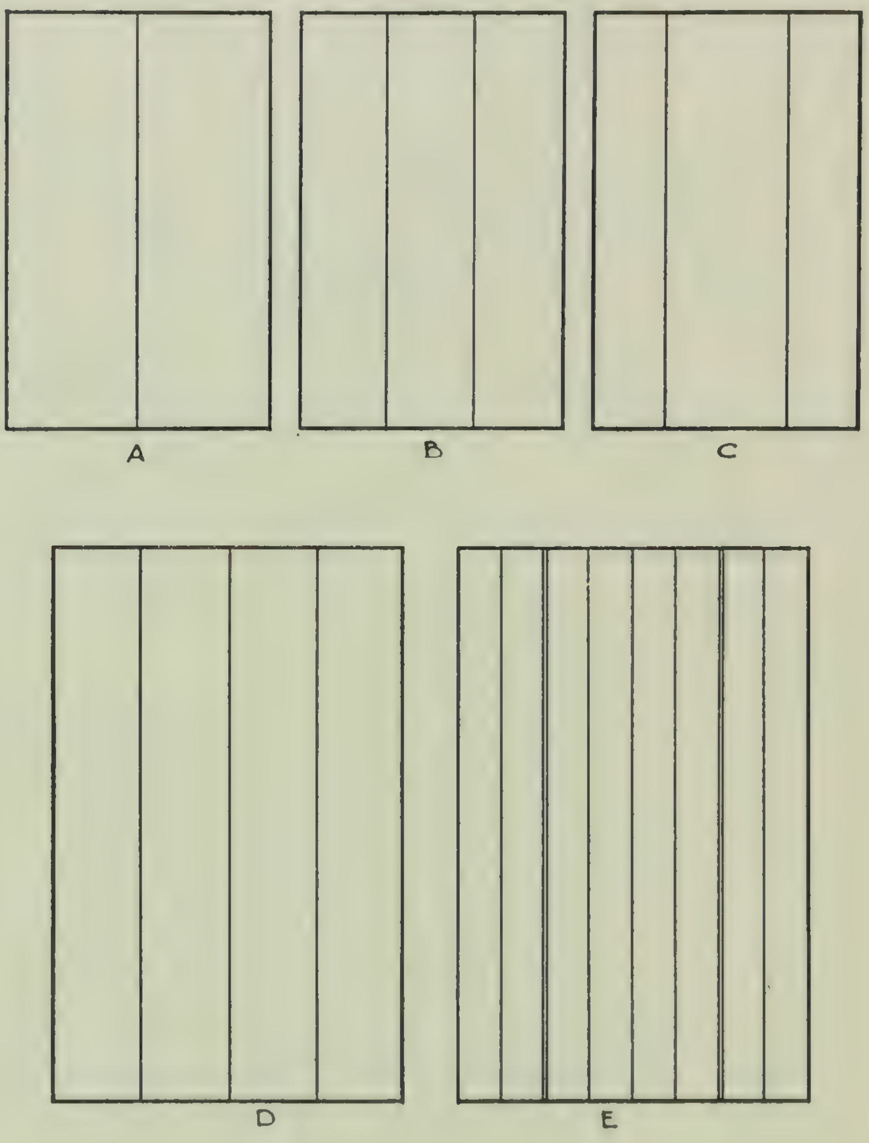
WHEN a primary mass has one of a secondary nature added to it the desirability of a harmonious relationship becomes imperative. The form and character of the second must conform to that of the first; otherwise it is impossible to gain an effect which will satisfy a critical eye.

The bath-room fitment at A, page 47, for instance, made by a student, shows an entire ignorance of this requirement. The secondary mass is planted abruptly on the primary and the effect is one of opposition and clumsiness.

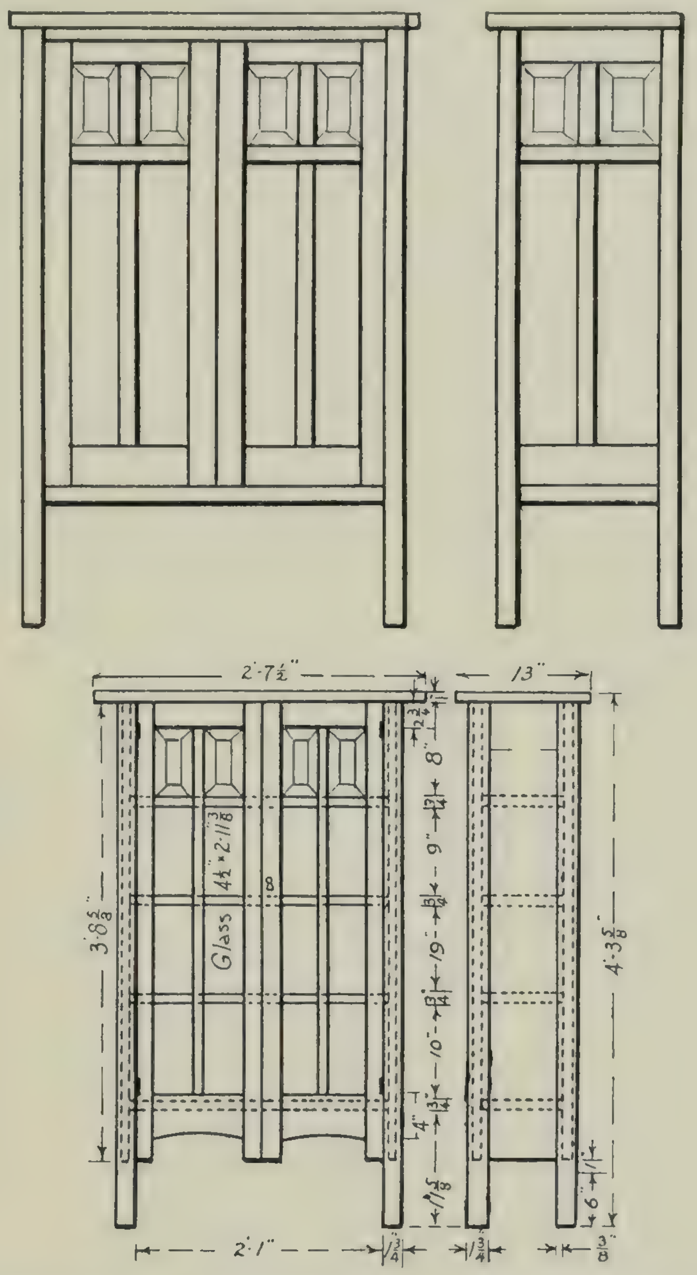
Design B, on the other hand, shows a regard for principles and refinement which completely alters the appearance of the fitment. Both masses are elongated and the angle pieces connect the two separate masses into one complete whole.

The table at C, page 47, also shows that the designer had an appreciation of fitness and a knowledge of principles. Moreover the lay-out of the design is excellent and ensures a reasonable finished result. The same can be said of the book-stand at D, page 48. It has been planned with a feeling for correct spacing and proportioning.

The vertical primary mass
and its subdivision into
two three and more than three
vertical parts.

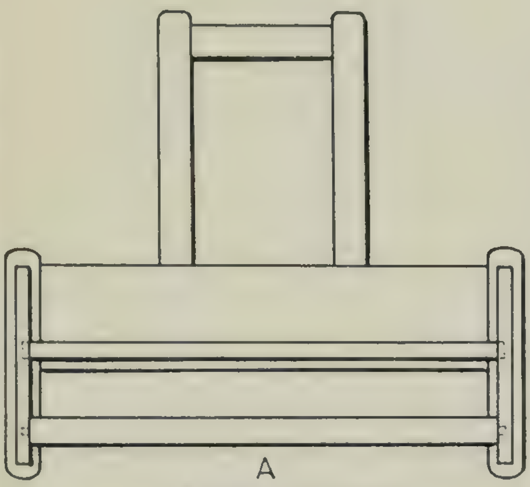


BOOK CASE

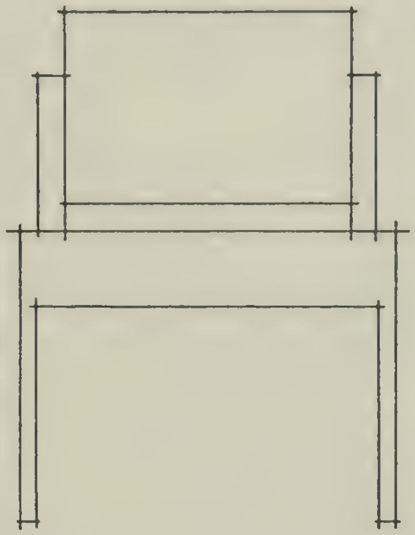


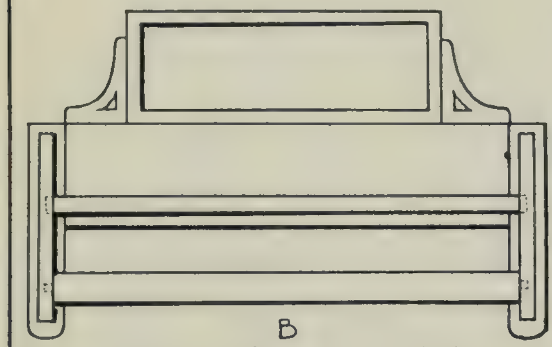
The three horizontal spaces are well chosen; if they had been otherwise the effect would have been spoiled; all of which goes to prove that with the addition of a secondary mass the responsibility of the designer increases and his knowledge of principles for critical purposes becomes increasingly necessary. Rule twelve should thus read:—

> *Rule XII*—When a secondary mass is added to a primary it must correspond in form and character in order to ensure harmony.

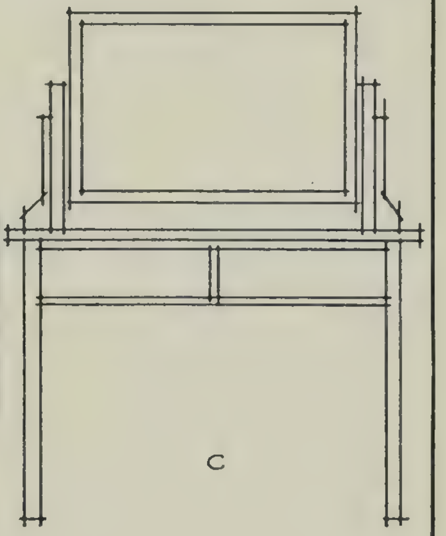


A
Bathroom fitment
as designed by a student

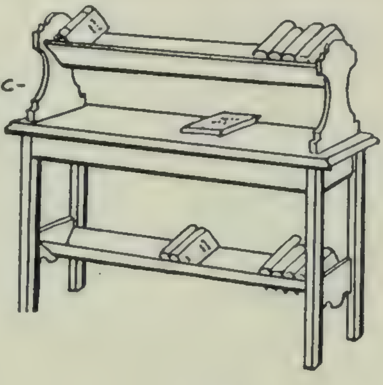




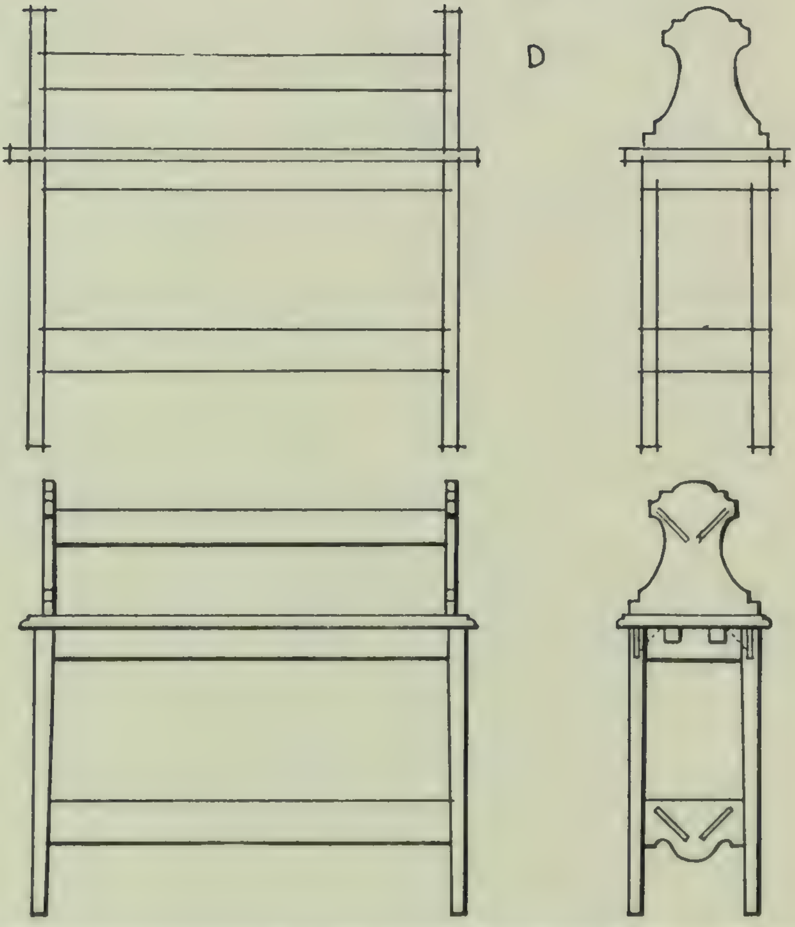
B
Designed from a knowledge
of principles



C



The primary and secondary masses.



OUTLINES AND CONTOURS.

THE previous rules from one to twelve have been dealing entirely with the proportioning and spacing of the primary and secondary masses with their various subdivisions. No regard whatever has been given to the outline or contour of the masses. But just as it has been found advantageous to understand the rules underlying the making of correct and beautiful proportions, so it will soon be realized that a knowledge of the underlying principles of curvature will make possible the designing of outlines and contours which shall increase the beauty of the project.

It was found in planning the primary mass that while some proportions were clumsy, others were refined; so in curvature some curves are crude, while others are graceful and beautiful to behold.

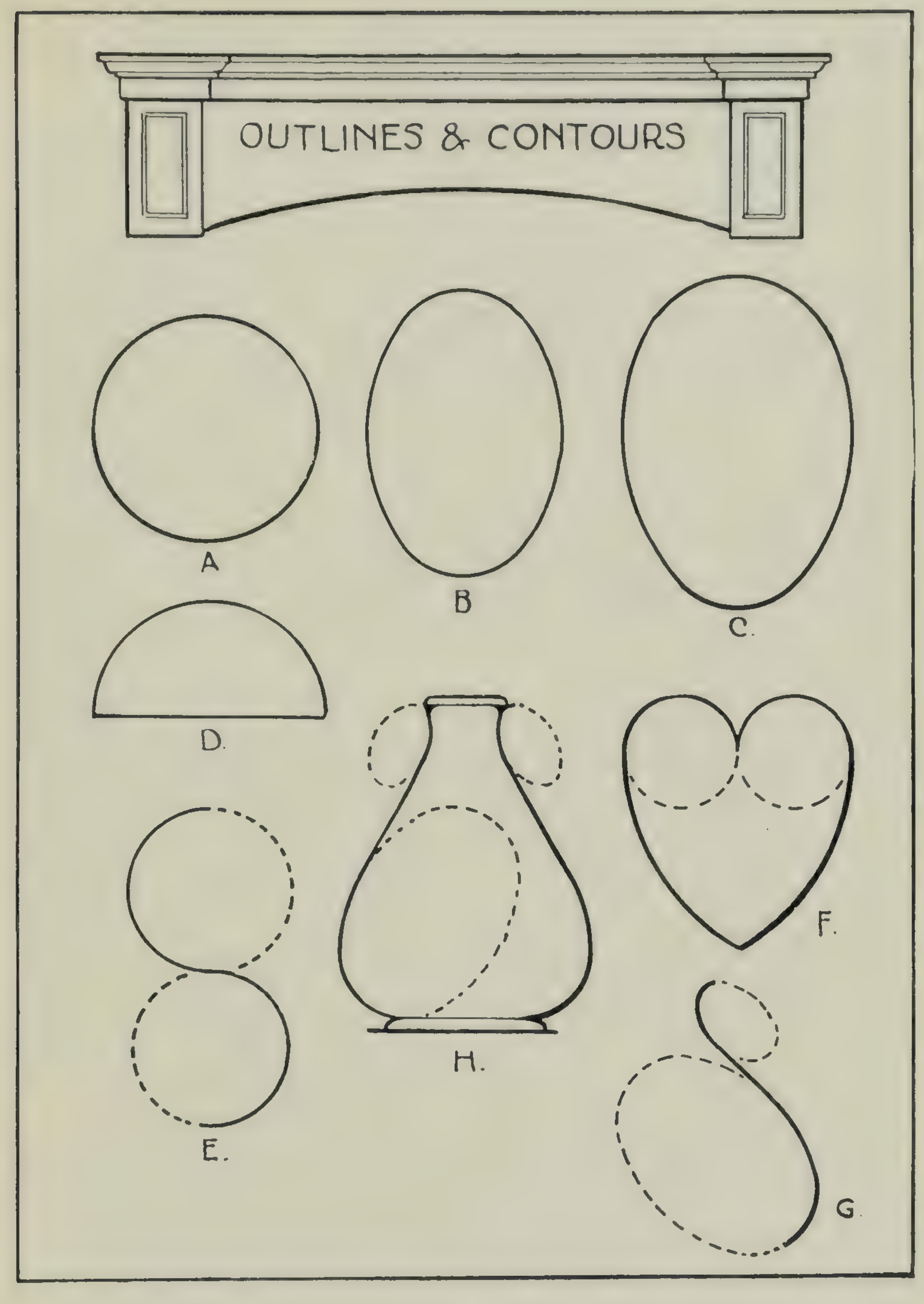
Make a serious comparison on page 51 of the circle, the ellipse, and the oval, and you will realize that while the circle is exceedingly common in design, its mechanical, wheel-like form lacks artistic refinement when compared with the elliptical and oval forms. The reason for this is partly explained by the fact that the radii of the circle are uniform in length, while the radii of the ellipse vary somewhat. In other words, the circle has one centre while the ellipse has two. The most subtle and artistic form of all, however, is the oval with its three centres and with a gradually varying contour.

For these reasons compass curves as at D, E and F, page 51, should be avoided as much as possible and elliptical or oval curves as seen at C, G and H should be practised.

Examples on page 52 show some development of contours; the base M shows the minimum which can be made for a support; example N shows a semi-circle cut out of the surface to lighten it; while example O shows an elliptical curve which is decidedly the best of the three.

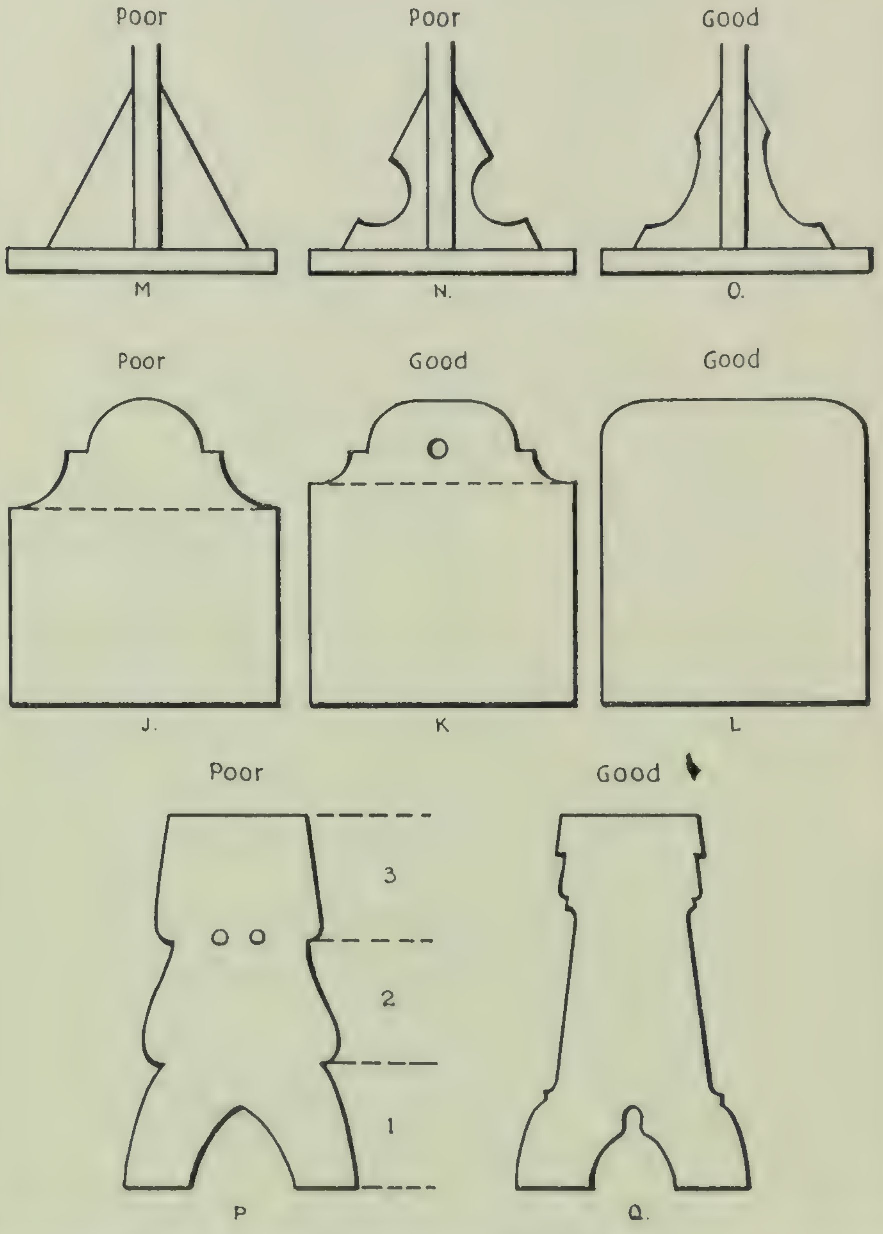
Example J illustrates an outline made of compass curves, while K shows the curves influenced by the oval or ellipse; the superiority of K over J is quite apparent and indisputable.

In design P, on page 52, one sees a mass form divided into three equal parts, disregarding design principles and rules, especially Rule VII, which reads thus:—"In dividing a vertical primary mass into two or three horizontal subdivisions, one of the spaces should dominate the others in a correct ratio." At Q, however, the mass form has been altered to conform to design principles and the improved effect is at once apparent.



PROVINCIAL LIBRARY.
VICTORIA, B. C.

OUTLINES AND CONTOURS



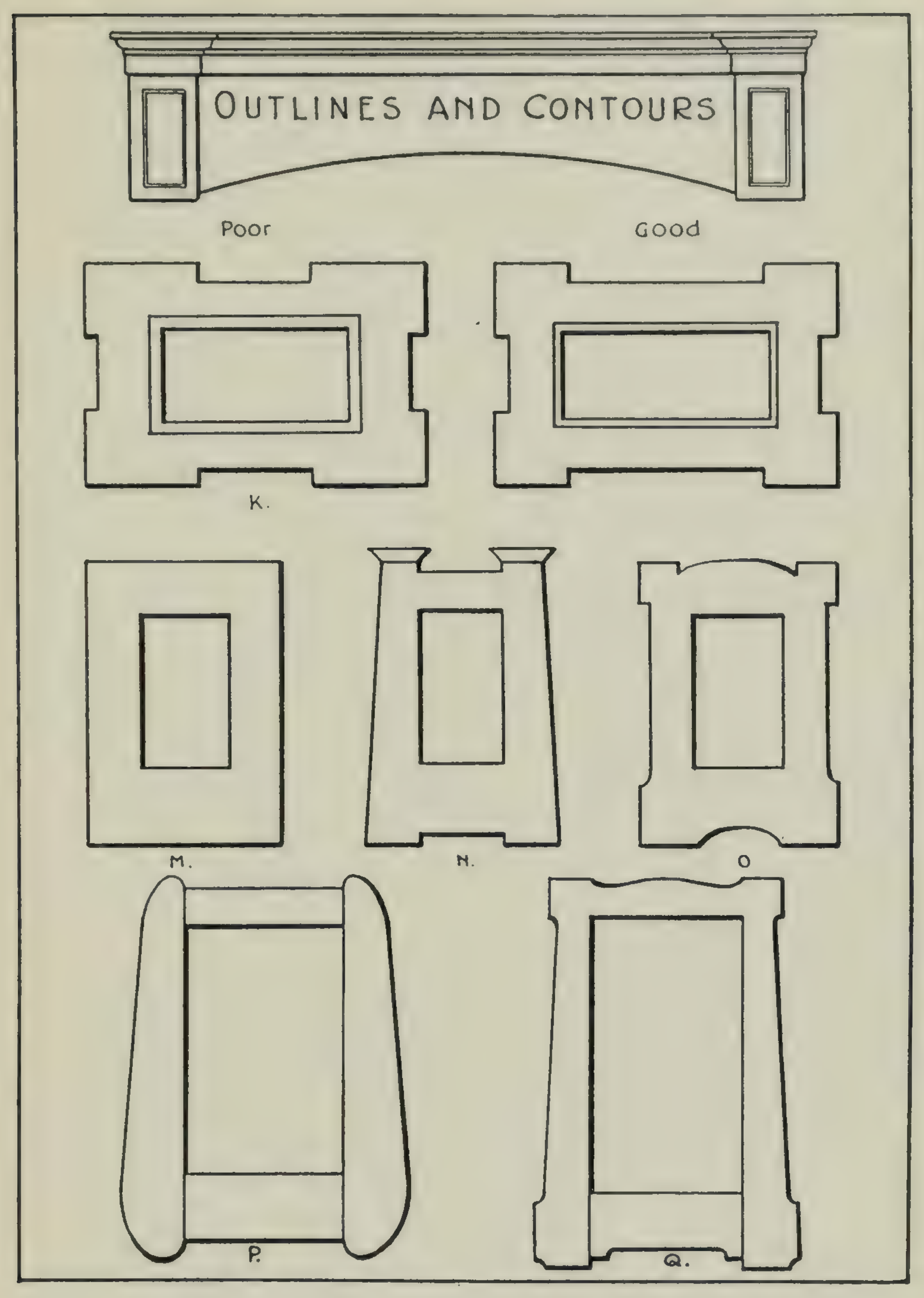
On page 55, diagram K shows a panel, the sides of which are divided monotonously into three equal parts, a division which has already been condemned when dealing with the horizontal and vertical primary masses. At L one sees the middle division predominating over those at each side; consequently a decided improvement may be observed. The width of the border has also been reduced at L and this also assists in producing a better general effect.

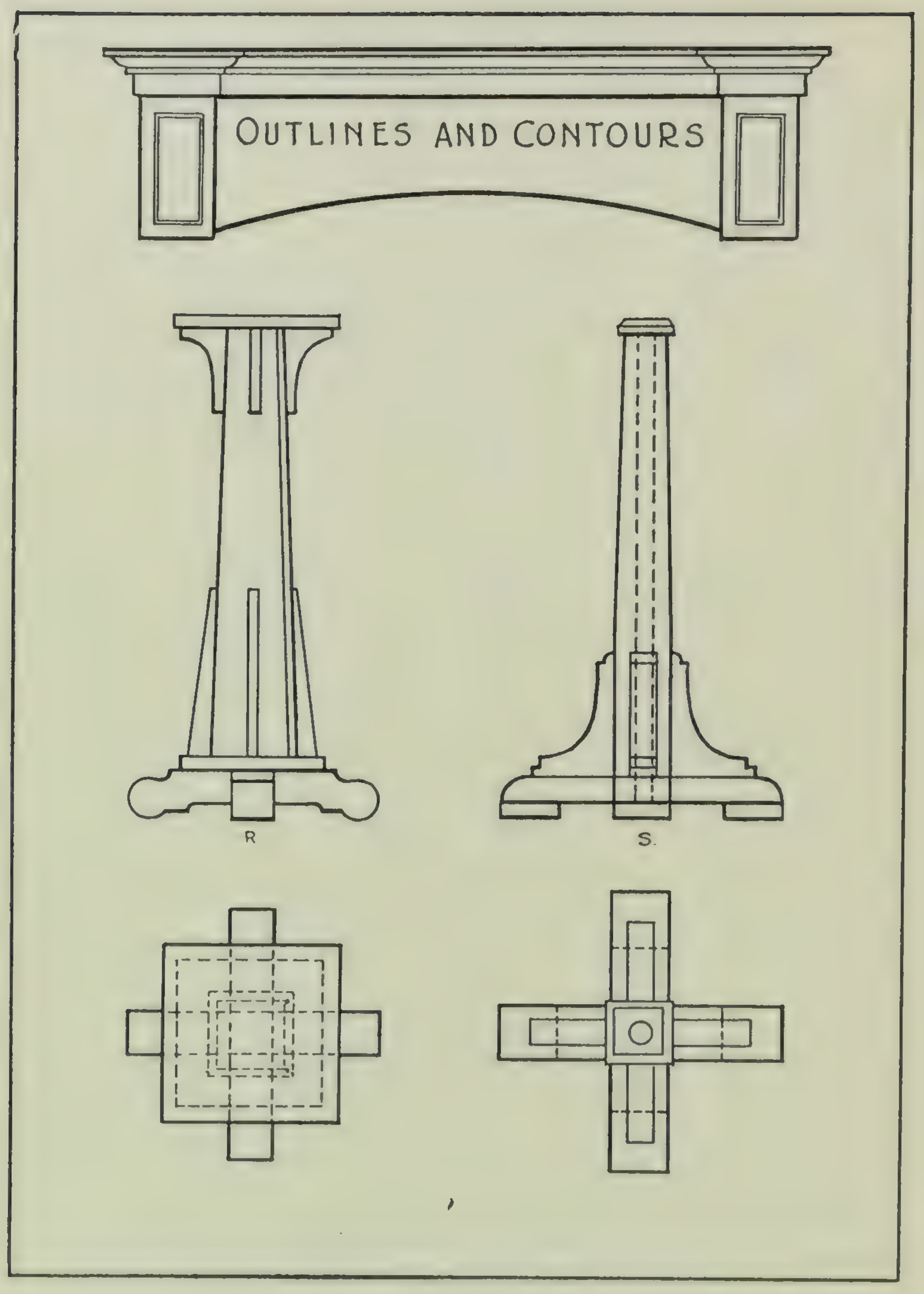
In the series of frames M to Q on the same page, one sees a group of work from students who vary greatly in their appreciation of line refinement. Figure M might be termed the minimum, and Fig. Q the maximum in contour design.

On page 56 two examples of stands may be compared, which show the importance of having a correct appreciation of contours. Both students have felt the necessity for some kind of link between the vertical and horizontal parts, but the one at R shows a crude notion, while the other at S shows refinement. In R proportions are clumsy and the curves circular; in S the proportions are subtle and the curves elliptical. The next rule may thus be stated as follows:—

> *Rule XIII*—For outlines and contours the elliptical or oval curves of beauty should be used which are more subtle, refined, and artistic than the circular.

This rule, however, does not mean to imply that no compasses should be used to lay out work and to divide surfaces. Those students who understand perfectly how necessary it is to obey Rule XIII in order to obtain artistic effects may use mathematical instruments as much as, and whenever they so desire.


OUTLINES AND CONTOURS
Poor
Good
K.
M.
N.
O
P.
Q.


OUTLINES AND CONTOURS
R
S.

GREEK CONTOURS.

NO better examples of contours can be found anywhere than in Grecian pottery. Reference to pages 59 and 60 will prove with what refinement of taste the craftsmen decided upon the main proportions, and what sensitive feeling they displayed in making subdivisions. The contours are elliptical or oval and the balance of parts and placing of handles for use is perfect.

The hydria (Figs. I, II and V, page 59) as its name implies, is a water-pot. It was vessels of this type which Grecian maidens took to the spring to bring water to the home. When empty it was carried on the maiden's head or shoulder in a horizontal position, and of course in a vertical position when full. Notwithstanding the fact that these vessels were for common and daily use they were beautifully designed. "Behold, Rebekah came out with her pitcher upon her shoulder and she went down to the well and filled her pitcher." Most probably this pitcher would be a hydria.

Urns such as No. II are usually large in size and made of clay. Not only were they used to hold water and wine, but they were used, also, as repositories for the ashes of the dead.

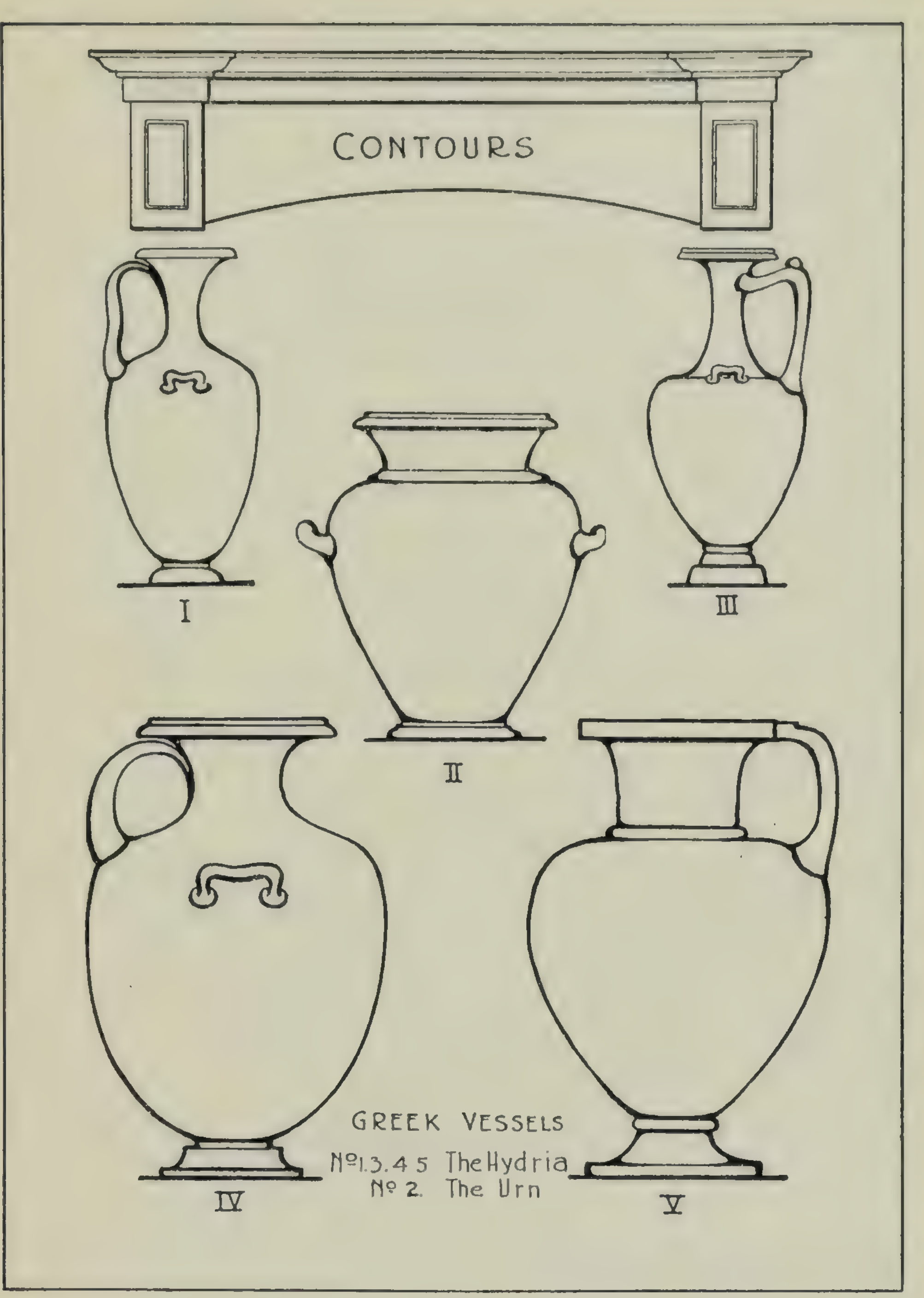
The lecythus (Figs. I, II, III, page 60) are small pourers and were employed to hold oil for toilet purposes. They were also often placed among other things in the tombs of those whose spirits had departed. The examples are usually of red clay.

Pitchers like examples IV, V and VI vary greatly according to their purpose. Those illustrated were made of glass and were most probably used to hold wine.

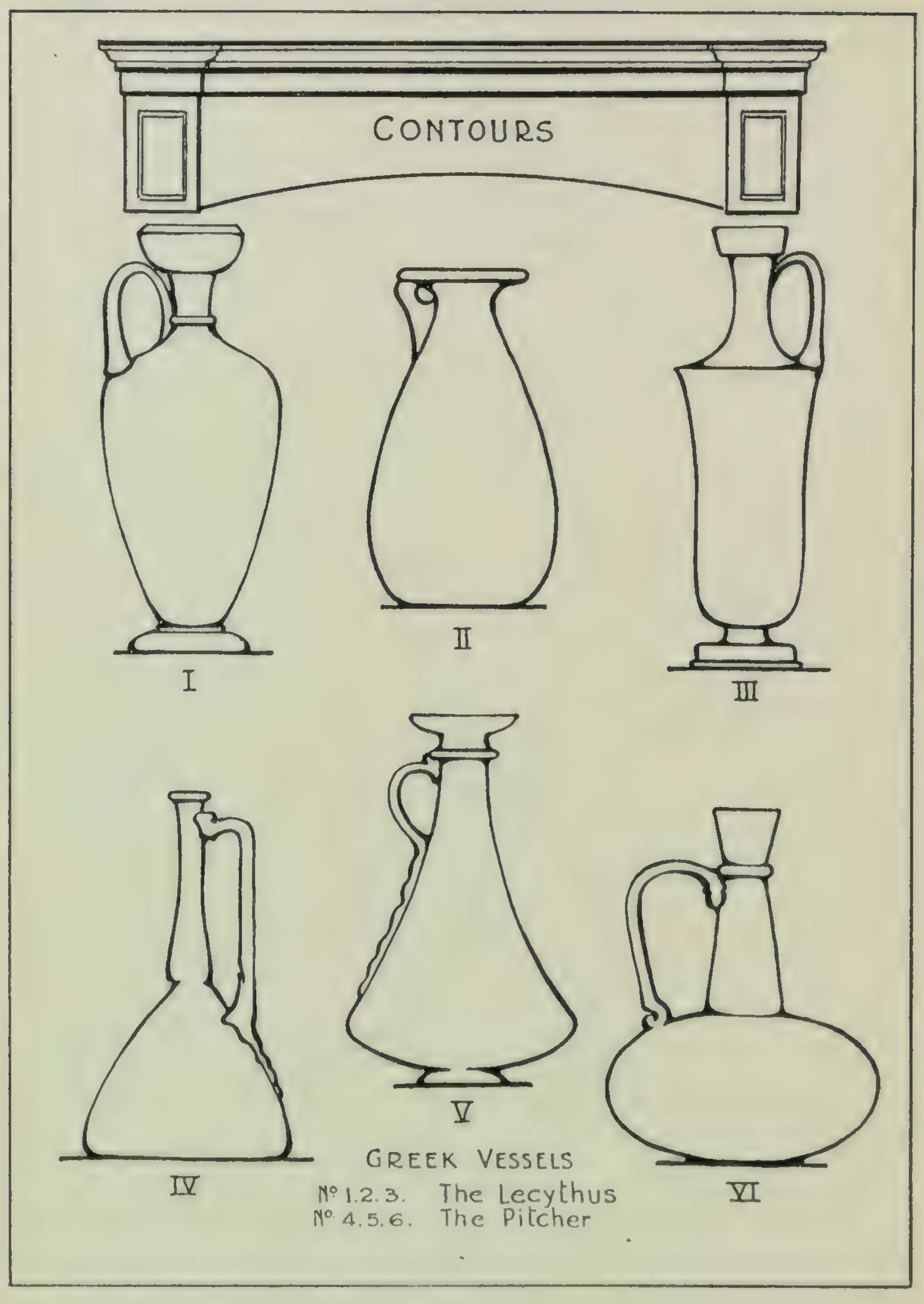
The examples of modern glass-work, page 61, show how fully good designers appreciate the contours of the craftsmen who lived in Grecian times and who raised their craft to an enviable position as an art.

When students begin to appreciate the oval and elliptical contours and prefer them to mechanical circular curves, their productions will take a decided step forward.

The subtle curvature of Grecian mouldings in comparison with those of later times is one of the proofs of superior refinement which we have had handed down to us. The sections of the Grecian mouldings during the best period are oval in form while those of the Roman are circular. The result was a more beautiful play of light and shade on Grecian buildings. (See page 64.)

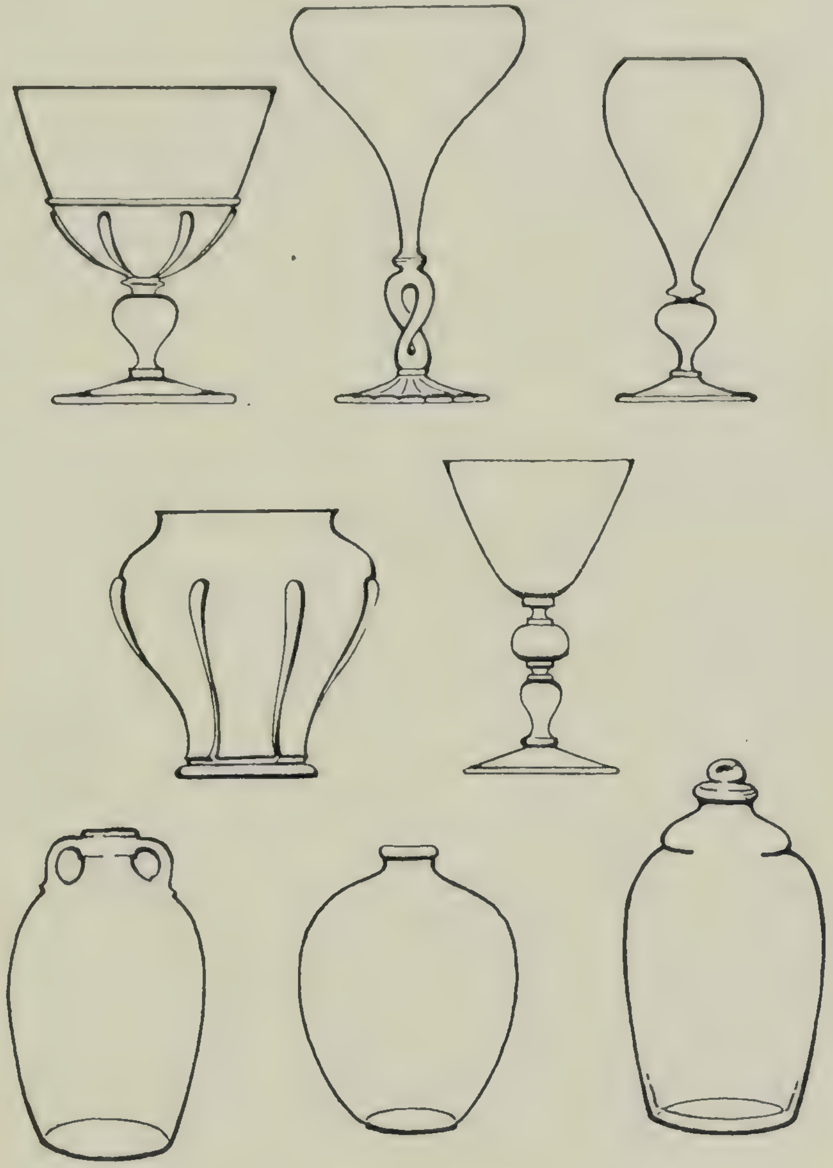


GREEK VESSELS
Nº1.3.4 5 The Hydria
Nº 2. The Urn



GREEK VESSELS
Nº 1.2.3. The Lecythus
Nº 4.5.6. The Pitcher

MODERN GLASS EXECUTED AT WHITEFRIARS GLASS WORKS ENGLAND.



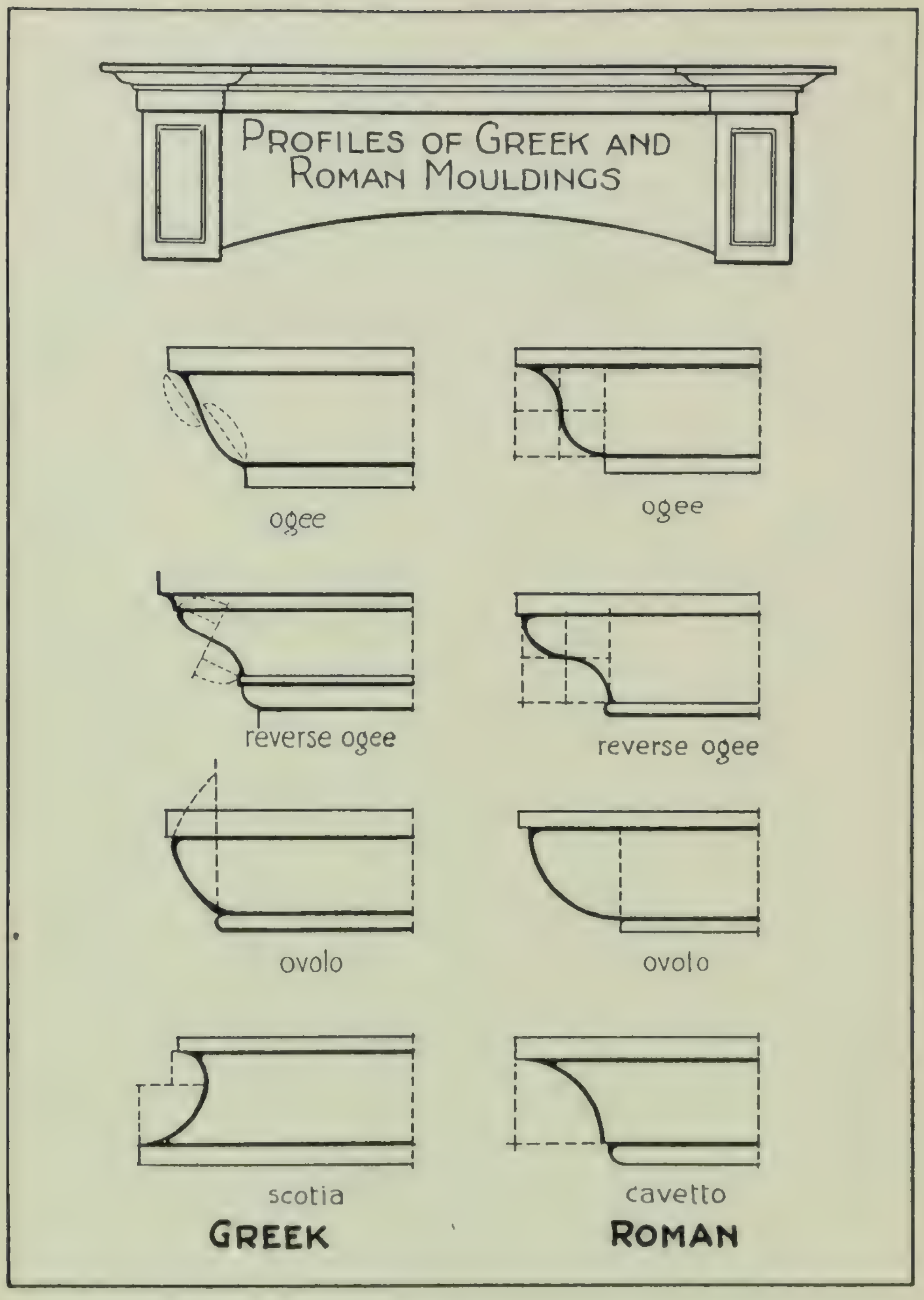
The spacing of the members was superior in Greek architecture: equality of widths was carefully avoided; proportions not easily detected at sight were indulged in; while consecutive curves were selected to make a flow of line.

In good examples similar contours never come together and the width of fillets are regulated carefully to prevent a clumsy appearance. (See page 65.)

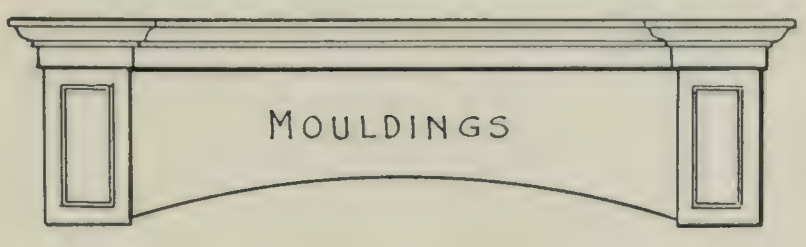
To obtain insight into good proportion, spacing and contours, a study of Greek entablatures and vases will prove a mine of information. Mouldings vary in contour according to their position; above or below the eye the page showing Base moulds, Intermediate moulds, and Cornice moulds makes this clear. The predominating shapes should also be studied. (See page 66.)

In decorating mouldings the line of the section should be made the main line of the decoration. (See page 67.) This is the great underlying principle which is obeyed in all good moulding designs. The main line of the egg and tongue design for instance, is the ovolo; the main line of the anthemion ornament on the *sima recta* moulding is an ogee line and the ornament on the *sima reversa* moulding has a reverse ogee. Straight-lined ornaments like frets are placed on flat bands. If this principle is thoroughly understood one is enabled to design harmonious and pleasing decoration on any shaped surface. Failure to understand this rule leads to many grave errors and blunders.

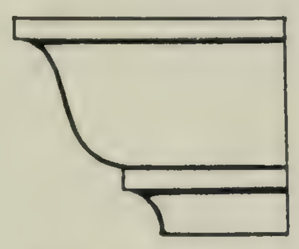
These mouldings also show clearly the applied principles of repetition, variety and radiation. In the ovolo the plain egg-shape is beautifully contrasted with the sharp tongue-like detail. Similar contrasts may be seen in the ogee, the reverse ogee, and the scotia moulding.



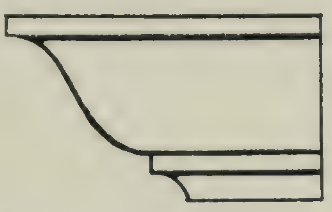
PROFILES OF GREEK AND ROMAN MOULDINGS



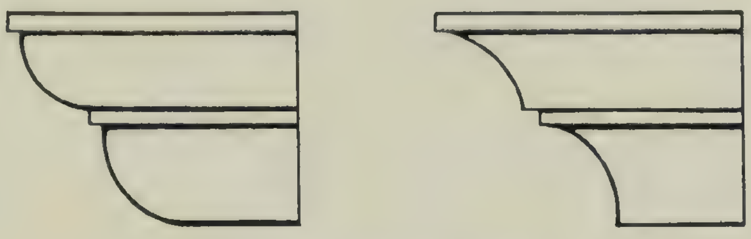
Fillets



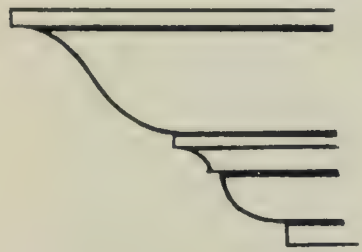
Fillet too wide



Fillet correct

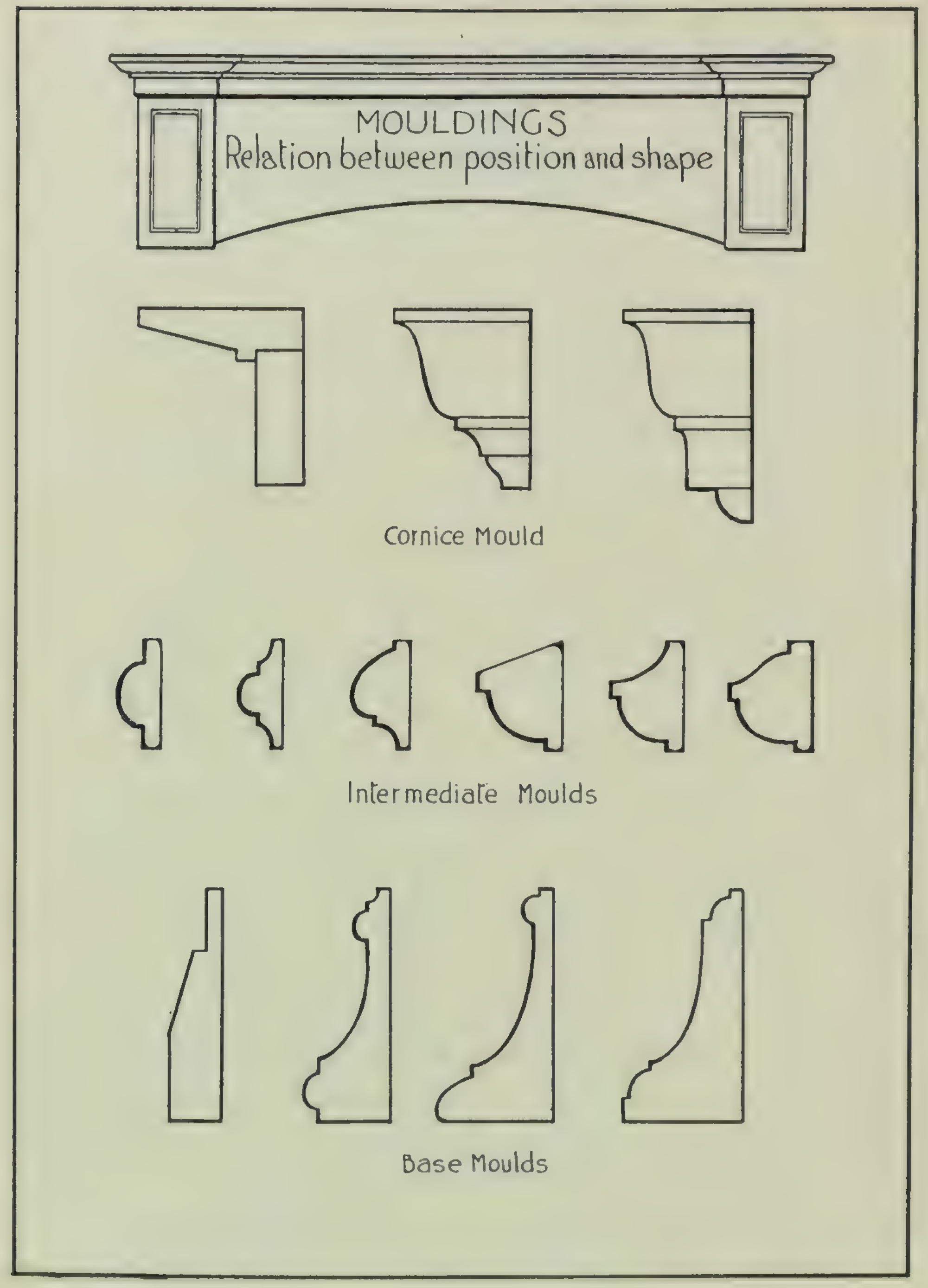


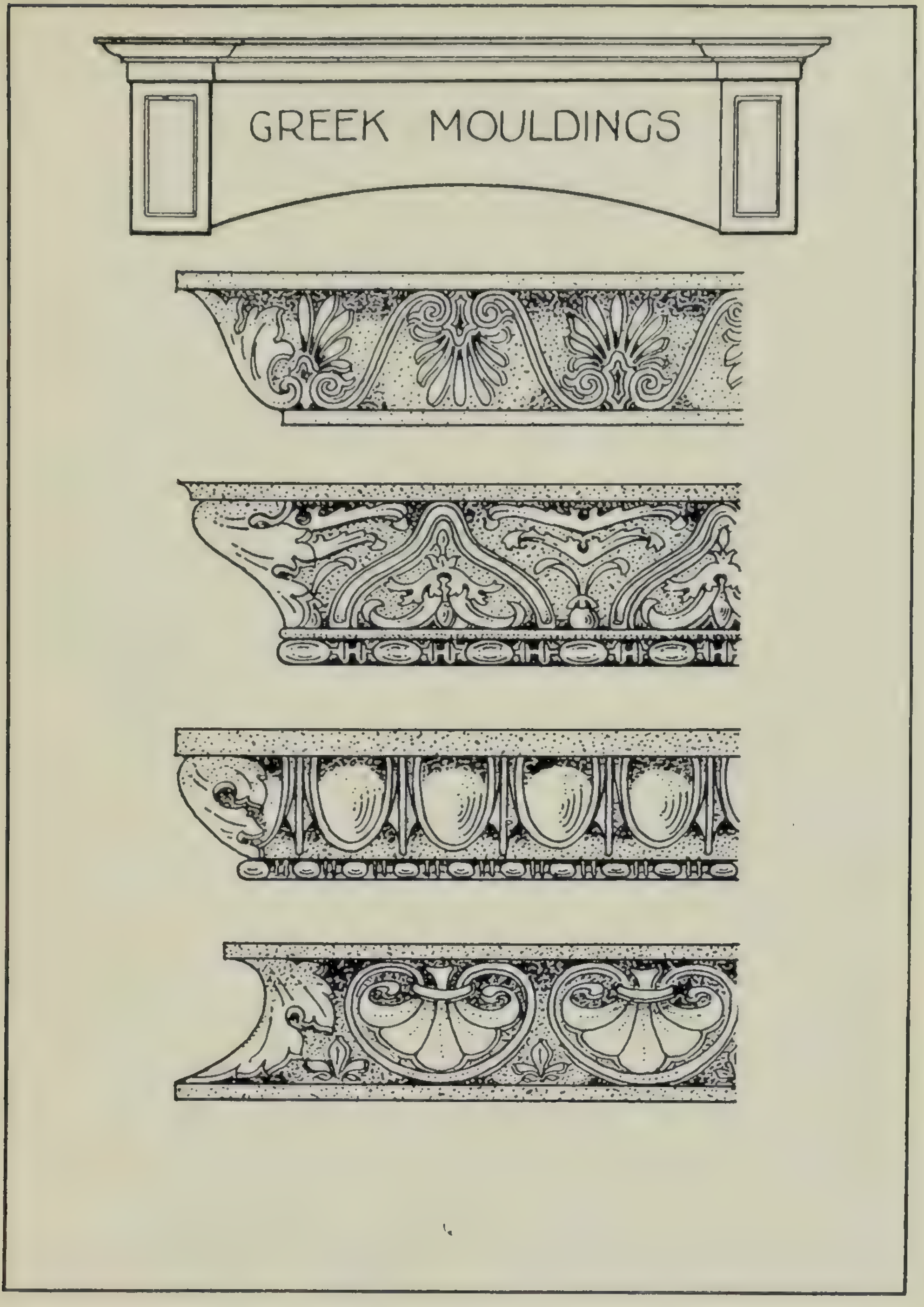
Similar contours should not be placed together



Correct combinations

In compound mouldings monotony should be avoided by making a dominant width


MOULDINGS
Relation between position and shape
Cornice Mould
Intermediate Moulds
Base Moulds


GREEK MOULDINGS

FRETWORK OR PIERCING.

FRETWORK has obtained a very bad artistic reputation owing to the fact that it has been and is associated with certain fragile, tender, and rather useless patterns. There is, however, a legitimate use for the fret-saw by which inlays may be cut and piercings may be made, which enhance the beauty of objects materially.

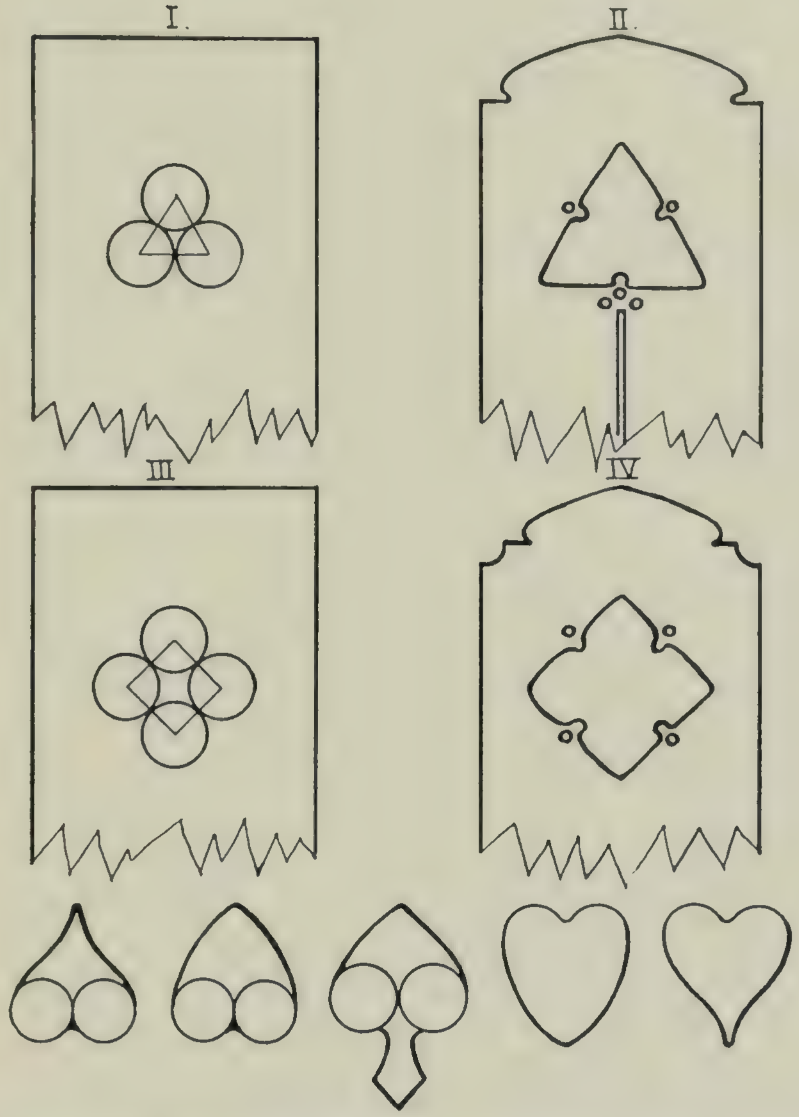
Three-ply laminated wood is good material to commence with because it is cheap and easily obtainable. A twelve-inch fret-saw frame and a sawing board with clamp, together with an archimedean drill are the main tools necessary. When the design is completed on the wood, a hole should be drilled through which to thread the fret-saw. The fret-saw blade should be unscrewed at the top in order to allow the blade to be put through. It should be noted that the saw cuts with the downward stroke; the saw teeth must therefore point downwards. The blade of the saw must be nearly vertical, leaning slightly away from the user. The saw must not be forced while cutting, but simply drawn up and down at a moderate pace. When cutting along flat curves which deviate very little from the straight, the downward strokes should be less numerous than when cutting small quick curves.

This wood-piercing will be found to be one of the most successful ways of decorating wood. It provides the pupil with ample practice with woodworking tools, and at the same time calls for good taste and an understanding of the rules of design.

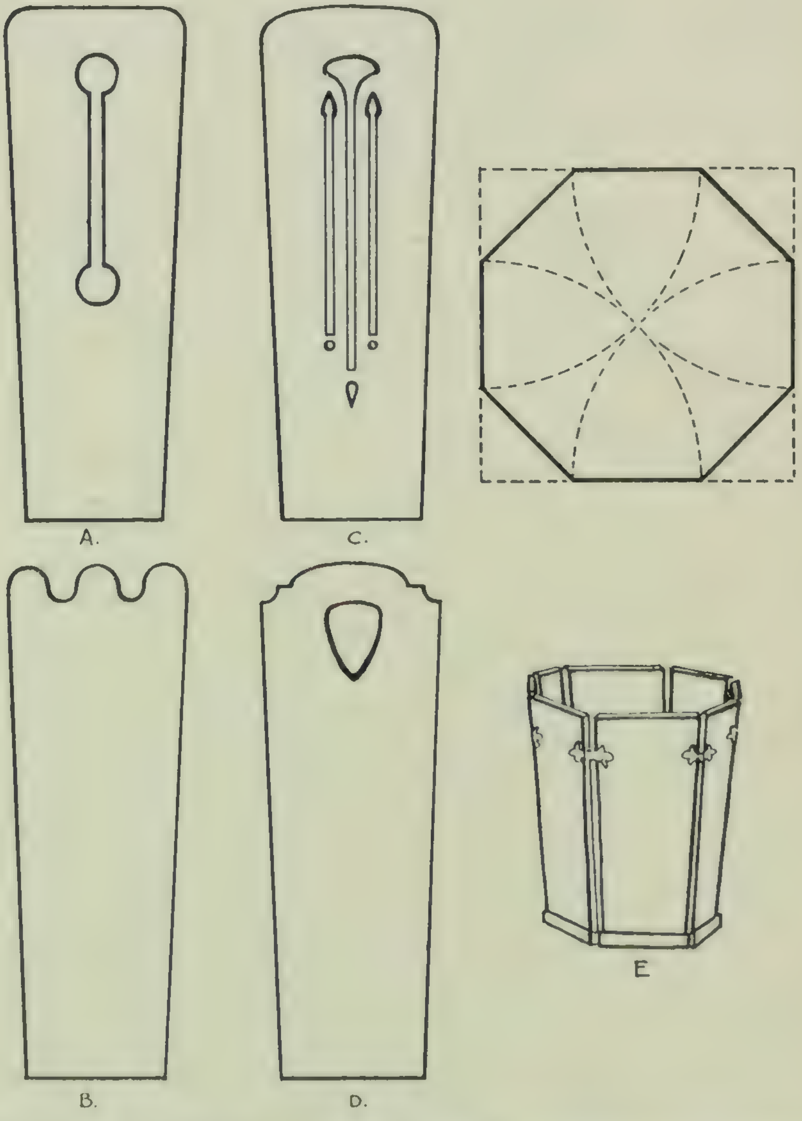
In designing for piercing, it is well to arrange the pattern so that holes may be made with a brace and bit; but from these mechanically made holes the refined forms must be developed, as seen on page 71. If the designer will first try to make some pierced forms in wood, he will be impressed by the shapes which it is advisable to draw. Rule XIII should be remembered at this stage, where it states that outlines and contours of elliptical or oval character are preferable to those having a circular character. It will, therefore, be necessary to modify the circular and develop the oval in order to obtain a satisfactory form, but great care should be taken not to weaken the structure. (See page 71.)

The group of four pierced patterns A to D, page 72, and A to F, page 73, should make this principle clear. Examples A and B, page 72, are the work of students who have only mechanical skill with tools and little taste. On the other hand, examples C and D show both skill and taste. The mechanical appliance brace, bit and compass were used on all four examples, but the appreciation of artistic contours enabled the designers of C and D to raise their standard of work from the mechanical to the artistic. The project at E, page 72, lends itself admirably for piercing and contour design, and similarly the taboret on page 73. Two ingenious and clever Arabian methods of piercing obtained by nailing slats cross-wise are shown on page 74, and another equally successful treatment for dwellings of timber construction will be found on the same page.

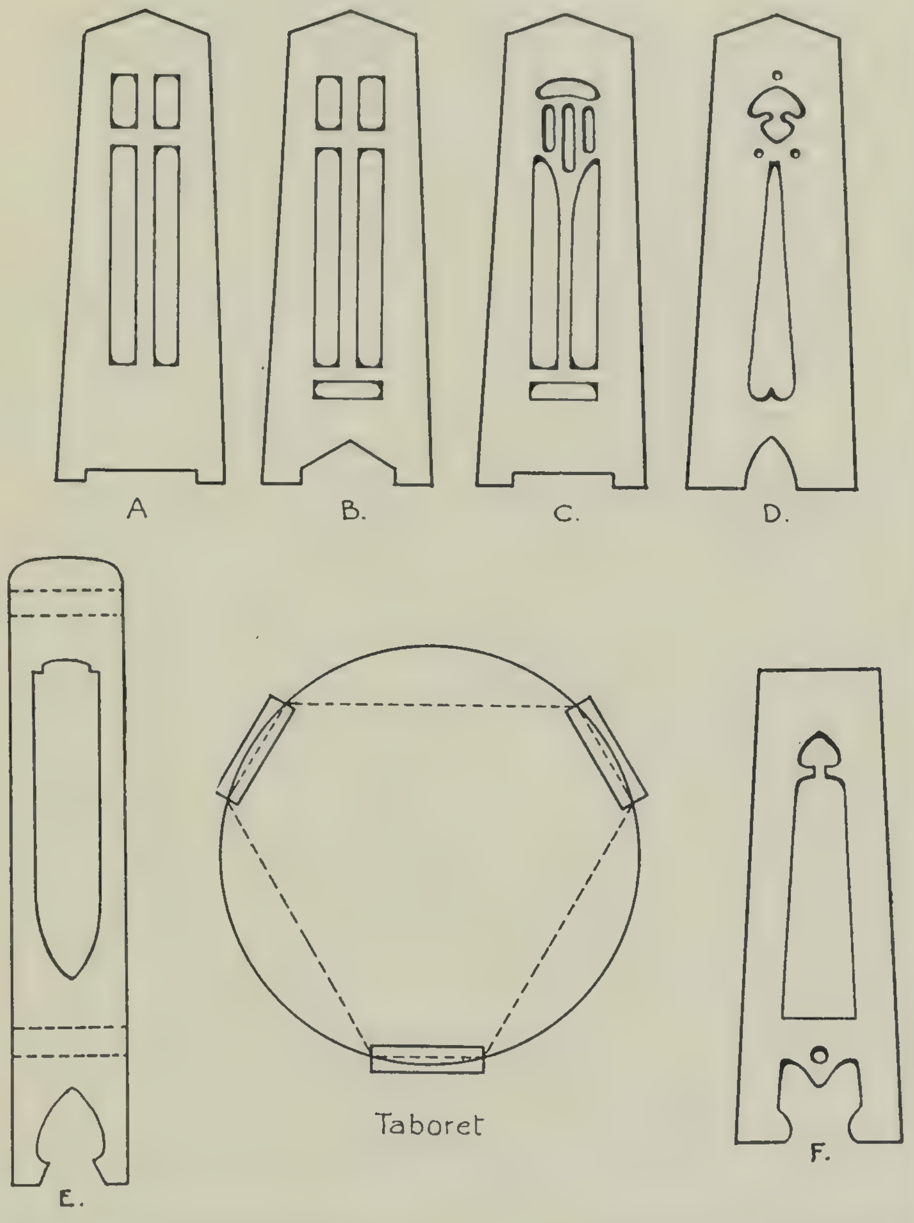
WOOD PIERCING



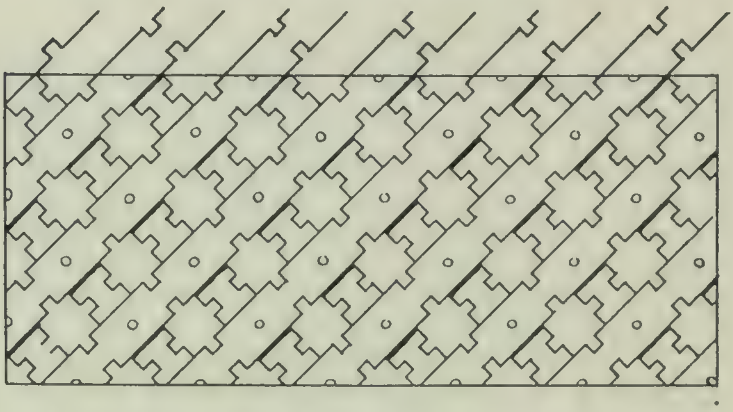
DECORATION BY PIERCING

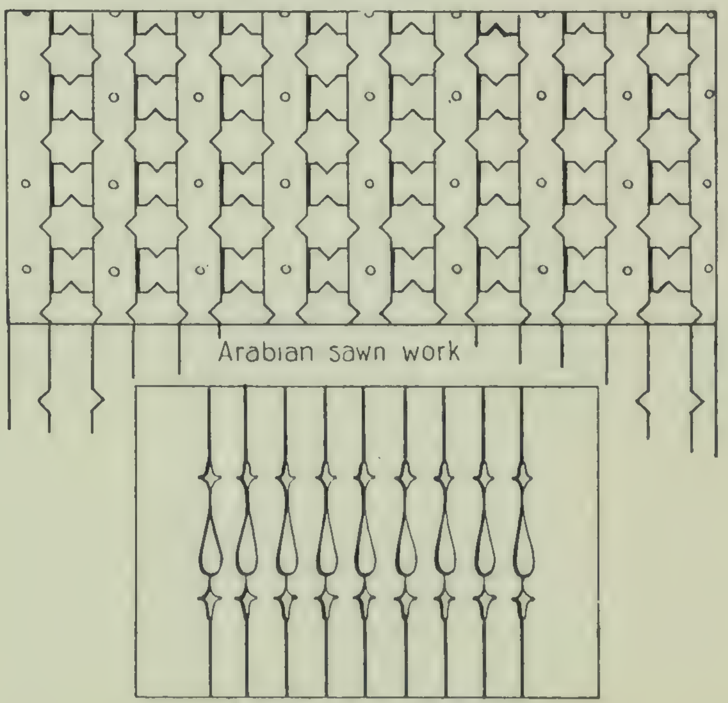


Surface enrichment by piercing



STRAP WORK





Arabian sawn work

From a Swiss Chalet

DECORATION OF THE SURFACE WITH VEINER OR GOUGE.

WHEN a project in woodwork has been carefully proportioned, and the subdivisions have been adjusted as correctly as possible; when the contours have been refined until the project is already a thing of beauty, then and not till then, should any decoration be considered.

Even after all this care has been taken, great restraint must be exercised in decorating the project in order to prevent over-elaboration, a fault frequently seen in the work of beginners. For this reason the border is the safest ornamentation to add to that beauty which should already exist. To emphasize by decorative lines the contours and outlines which have been satisfactorily and pleasingly designed is a problem to be commended. Such border decoration for projects made of wood will be found to be most satisfactory and least likely to violate good taste if they are made with woodworking tools. Therefore, for the beginner, the simple veiner or very small gouge may be used. The tool should be sharpened with the face of the V slightly inclined, as this facilitates cutting. (See page 79.)

Frankness in tool work is always acceptable, and the decorative forms should always be appropriate to the material and to the tools with which the forms are to be made. The lines which are designed for the veiner should be lines which can be made with that tool without any trickery or excessive practice. Cognizance must also be taken of the kind of wood which is used, for the coarser the grain the simpler the forms must be. Almost any kind of wood will do for the veiner, but the following can be specially recommended:—oak, walnut, kauri-pine, yellow pine, teak. Tools for incising may be as follows:—¼″ veiner, 5/16″ V. tool, ¼″ chisel, ¼″ gouge, 1 nail punch, 1 mallet, 1 pair clamps.

Before making a design it would be well to make some cuts with a veiner and thus become acquainted with the type of line which is appropriate to the tool. When this experience has been gained it will be found that long, sweeping, unbroken curves of uniform depth and lines radiating from each other are the most suitable.

No apology need be made when the distinct character of the tool is left on the material, and no scraper or glass-paper should be used for smoothing: it is an artistic and human quality which is desirable and not that of a mechanical nature.

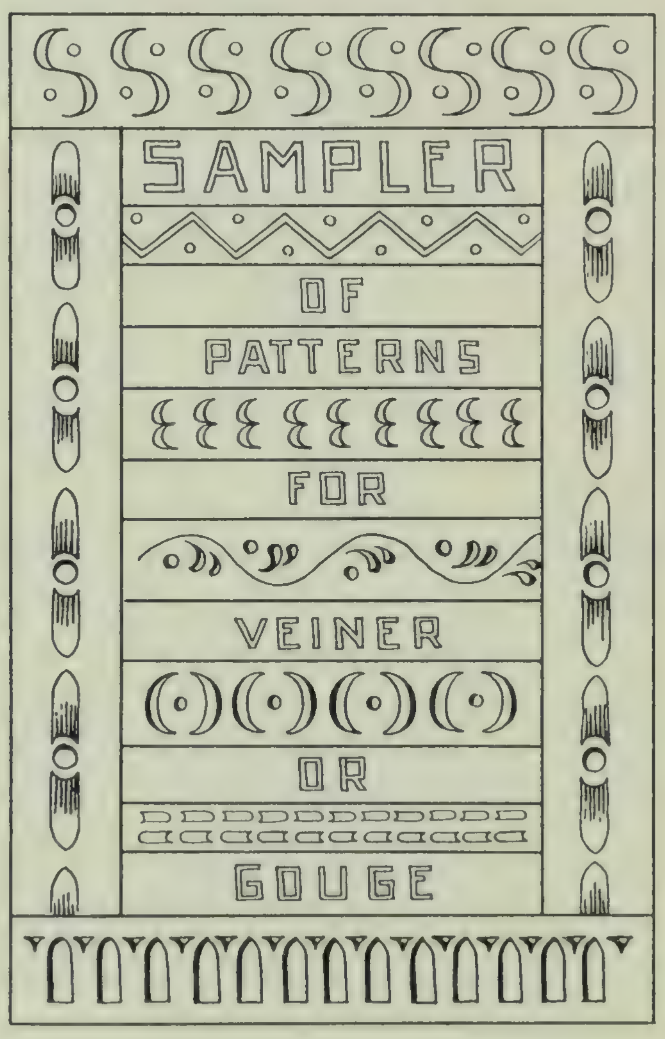
Attention to page 78, on which is an illustration of a sampler of patterns which have been cut with a veiner and small gouge, will make the above remarks clearer. This V tool work is sometimes termed "incising" and it has been practised from earliest times. The pattern may be slightly modelled, but relief should not be greater than the incised outline, and if the background is punched it should be very slightly.

Incised decoration is satisfactory for flat surfaces such as table or stool-tops, seat-backs and places where relief carving would interfere with the utility of the object.

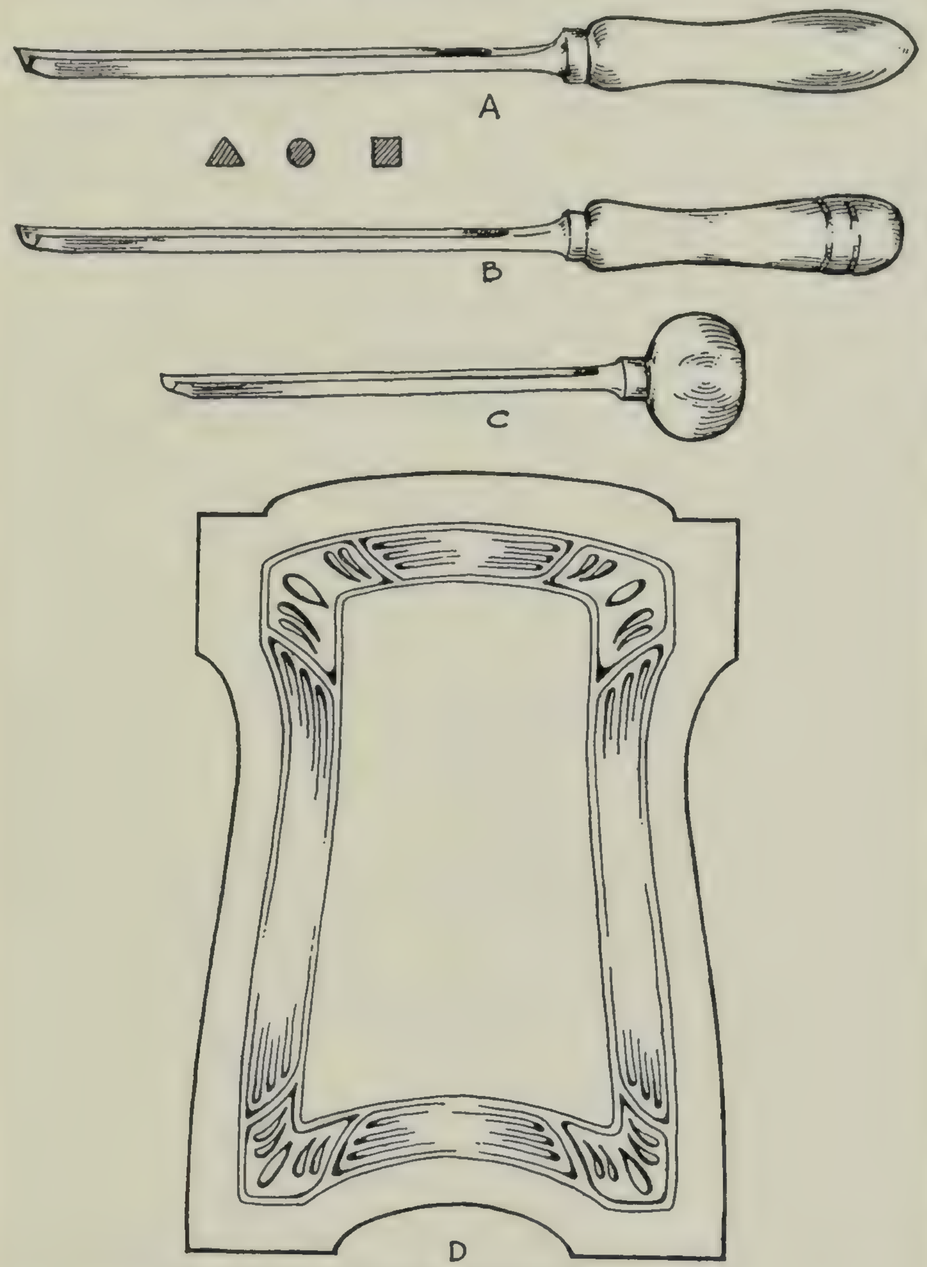
It should be distinguished from low-relief carving which has the background decidedly set in and punched. Low relief carving is unsatisfactory for table-tops because standing objects are unstable, and it is equally unsatisfactory for stools and chair-backs.

Incised design should have a feeling of flatness, but the effect may be enhanced by colouring with wood stains in which case it is generally advisable to give the wood a coating of gluesize before colouring. An excellent effect is also obtainable by the old method of filling the incised lines with coloured material.

In designing borders some fundamental principles underlying successful arrangement may well be considered. In spacing the border on the panel, beware of equality as at H and J, page 82, and A, page 83. Adjust the spaces carefully as at I, page 82, remembering that ratios which are difficult for the eye to detect are more artistic than those which


SAMPLER
OF
PATTERNS
FOR
VEINER
OR
GOUGE

THE V TOOL AND VEINER



are easily seen. A single border-line or perhaps two lines with the corners emphasized, frequently gives a more refined effect than a mass of cutting with ten times the labour of accomplishment.

The decorative features or filling of the border may be made by the repetition of some simple form like a V tool line as at A, page 83. This extremely elementary form, however, would immediately become less monotonous, and, therefore, more interesting if another form was introduced as at B. An improvement on even this arrangement is seen at C and the examples on pages 83 and 84 show what a wealth of ingenuity and inventiveness may be brought into activity when a design for a border has to be devised and carried out with simple V tool cuts and punch marks as motifs.

In the process of pattern-making, it should be noted that repetitions with variety are fundamental principles of design; that repetition alone as at A, page 83, is not sufficient for an artistic effect, but that both principles must be in company as at B and C. Illustrations G, H and I, will show the importance of varying the forms in order to obtain a completely harmonious pattern. The borders B, C and D, page 84, show suitable and effective designs. Example A has already been referred to as having the border too wide. Example D, page 84, is an exceptional piece of work and together with the examples on page 85, was all carried out by young pupils. With the knowledge referred to before us it is possible to define rule fourteen as follows:—

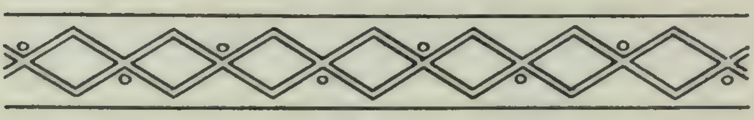
> *Rule XIV*—The border should first have a correct proportion in relation to the panel, and should be decorated by the repetition of varying forms to prevent monotony.

In decorating running bands it is interesting to note the rhythm which is made by the repetition of a simple form or a series of forms placed side by side. Such graphic regularity may be likened to that rhythm in sound which produces music and also to the rhythm in verse which produces poetry.

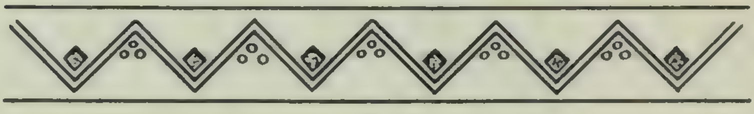
Monotonous music tones are produced by uneducated or uncivilized peoples, as for example the sound of the tom-tom. Border A, page 83, is a tom-tom design. Border G has greater variation, but border I is musical harmony. Decorative design may be termed graphic music; and the history of the race proves how natural to the human being are both line rhythm and sound rhythm.

On page 86 there is some wonderfully rich incised work in plaster. This is common among the Moors and was carried out when the plaster was wet. The same type of ornament can be made on clay for tiles. The character of the ornament is very similar to V tool work and the characteristic design could easily be translated into wood, plaster, or metal. In wood, a V tool would be used; in plaster a spatula; and in metal a tracer or liner.

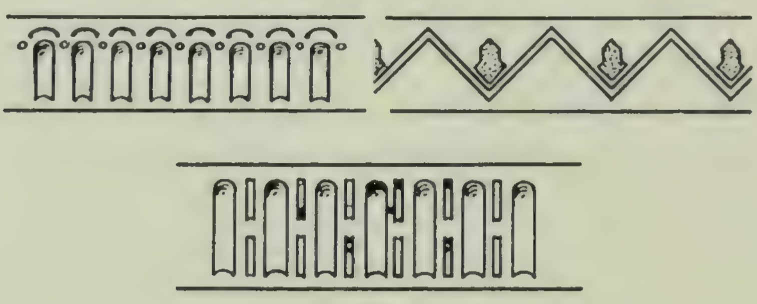
THE BORDER



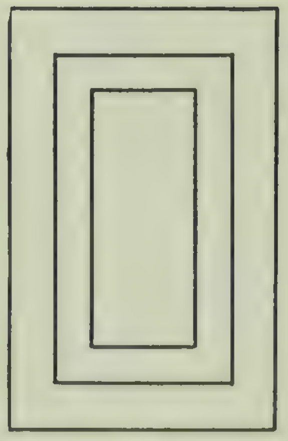
E



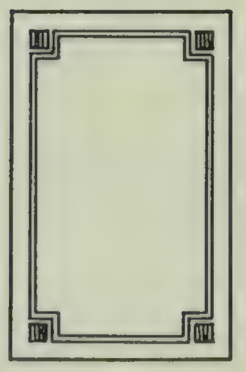
F



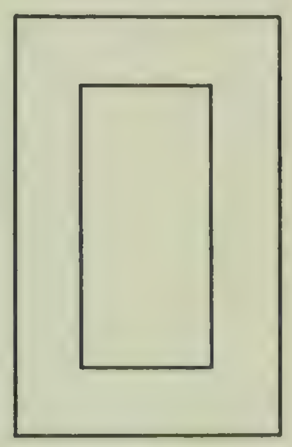
G



H

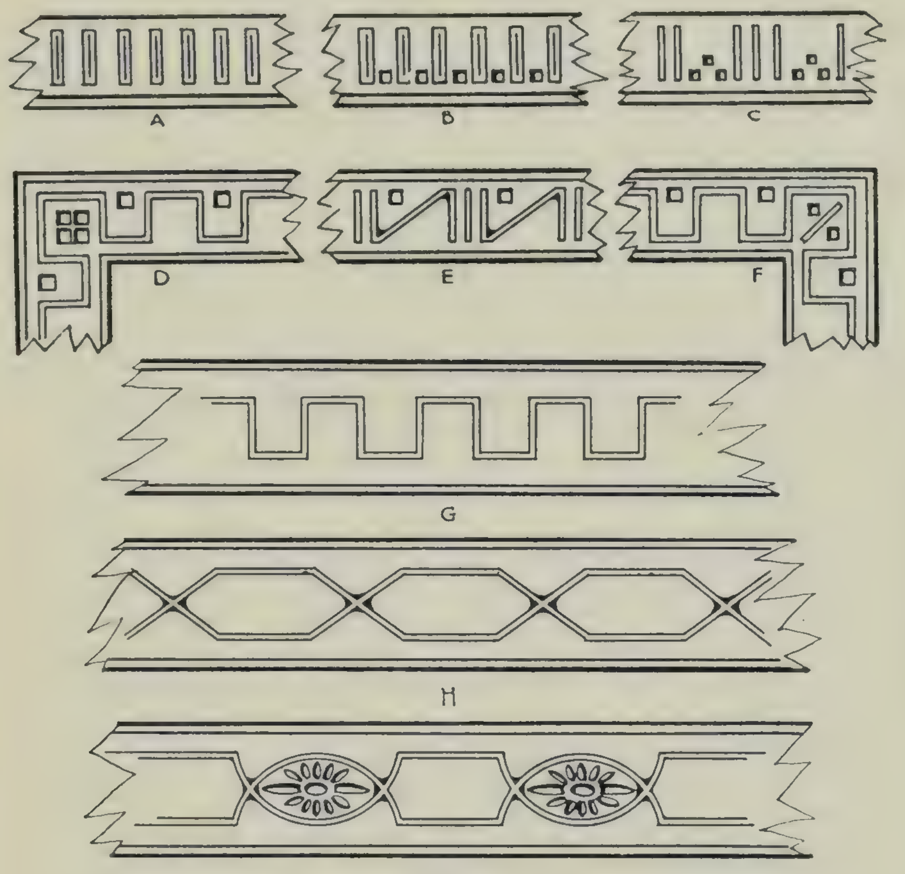


I

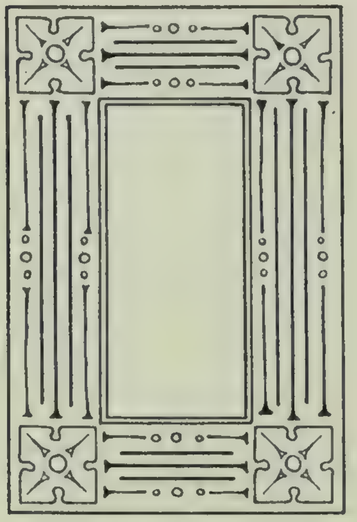


J

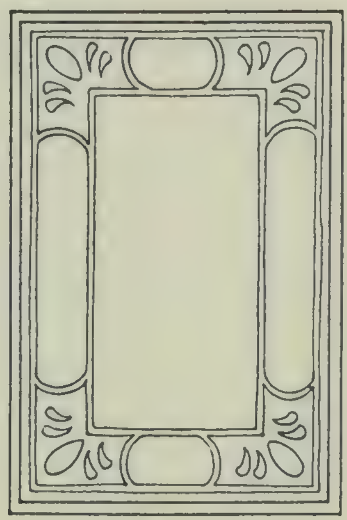
THE BORDER



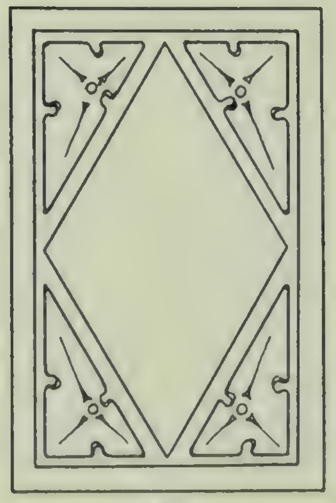
The three elemental forms of design. The vertical, the inclined, the curved are all required to make a completely harmonious pattern.



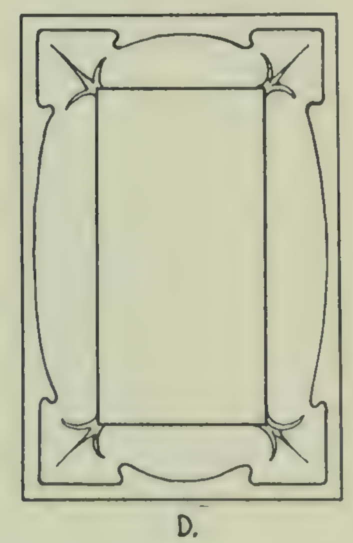
A.



B.



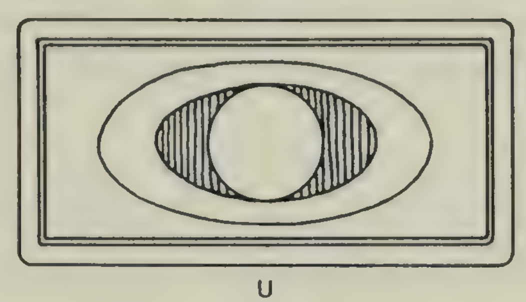
C.



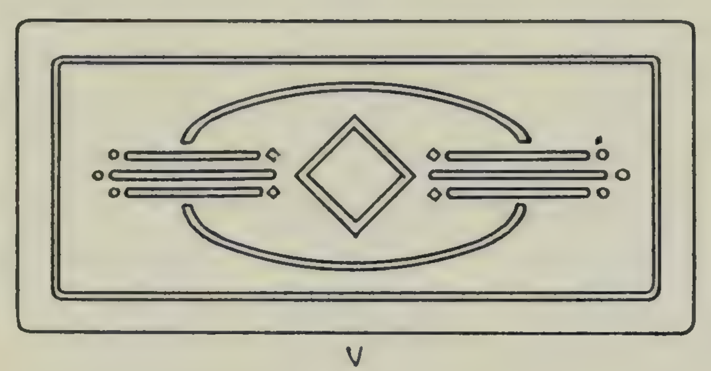
D.

Decoration with the Veining tool

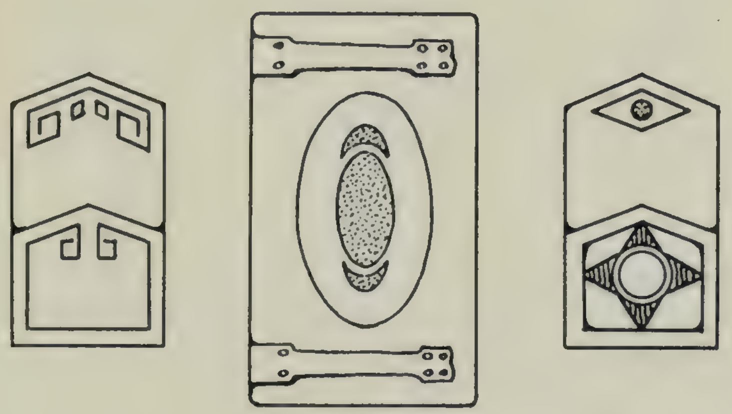
By Students



U

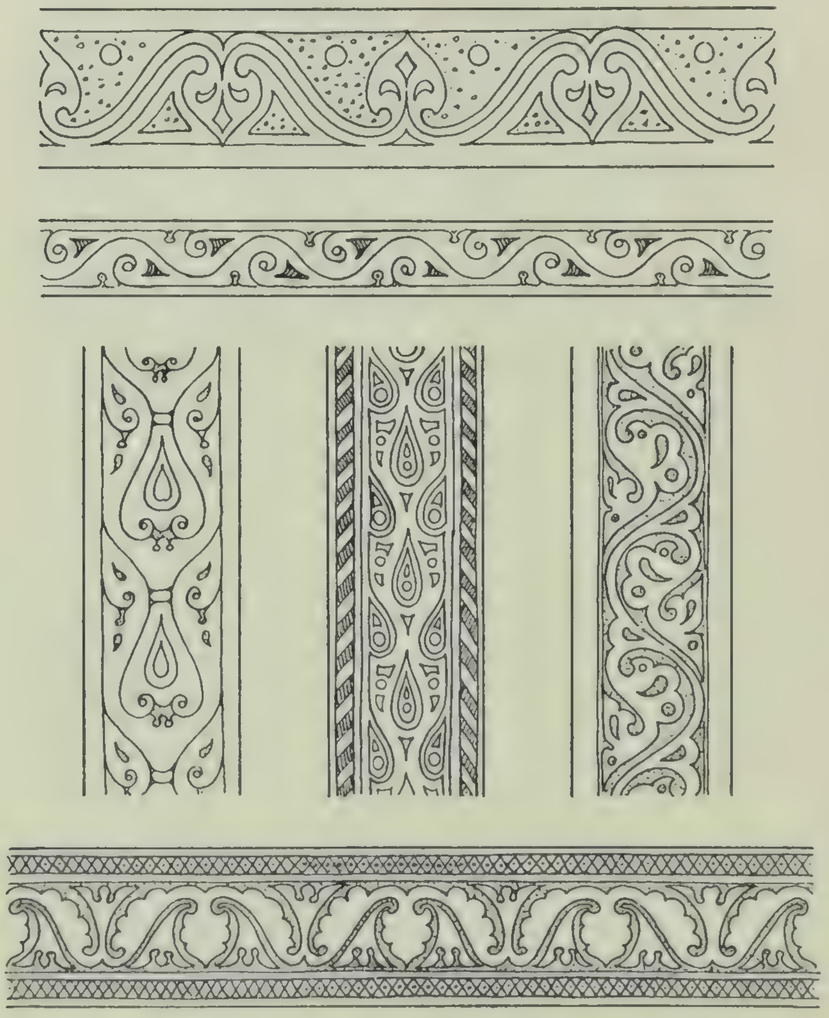


V



W

ANCIENT ARAB INCISED WORK IN PLASTER



THE PANEL.

WHEN the designing and making of borders has been successfully studied, the problem of designing a simple panel for incised treatment should be attempted. The characteristic forms of the design should be made for the veiner or small gouge. As has been previously stated there need be no attempt to model the surface of the forms: the decoration should be essentially flat.

The artistic difficulties in designing a panel are infinitely greater than those encountered in designing a border. In the border design it has already been found that the width of the border in relation to the width of the panel was an important decision. In the panel design the proportions of height to breadth cannot be too carefully checked. The panel designs A, D, G, J, page 90, made by pupils are all too near a square to be agreeable.

The main decorative lines on the panel design should be so drawn that they harmonize with the shape of the panel; in other words some lines should follow the boundary lines. The lines of the designs on A, D, G, J, page 90, do not in any way conform to the shape of the boundary lines, and for this reason, are unsatisfactory. In designs C, F, I, L, on the same page, the adjustment has been made to suit the space.

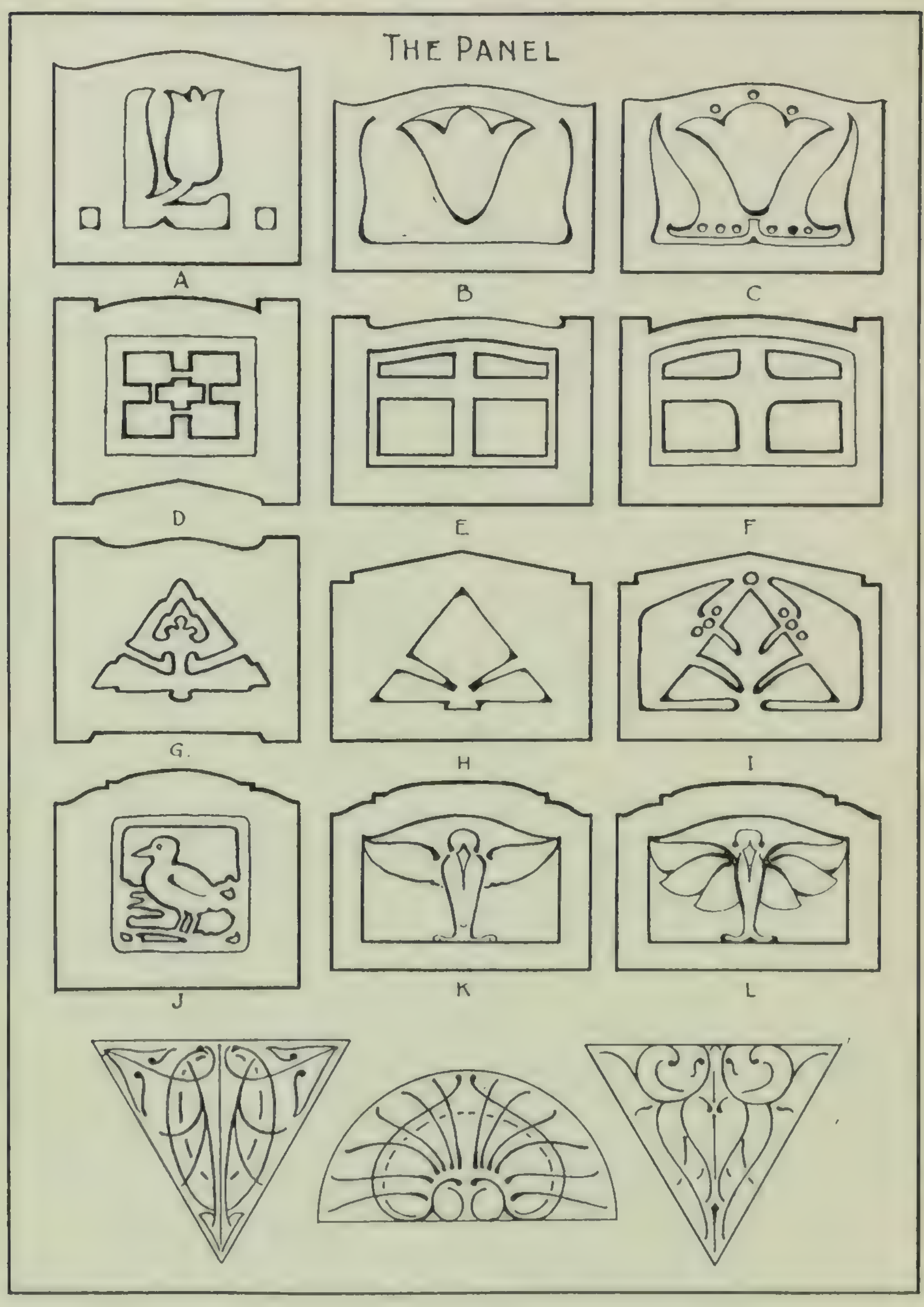
It has already been made clear that the characteristic forms of the design should be made for the veiner, or parting tool, as it is sometimes called. This cannot well be over-emphasized because only lines which can easily be made with the V tool should be drawn with the pencil. For this reason the designer should have some experience with the tool in order that he may know the better how far he may go with his pencil.

In the desire to design effective lines which can easily be made with the tool referred to, long, sweeping, radiating lines will be found to be satisfactory. The curved and radiating lines seen on pages 91, 92 and 93, are fundamental lines to beauty. Moreover they are not only the lines appropriate to the veiner for woodwork but to the tracer for metal-work; to the spatula for clay-work; the stylo in leather work; the chisel in stone work; the pen in lettering and page decoration. It was noted in making patterns for the borders that variety of form was essential to a satisfactory design and in like manner a panel design can only escape monotony by introducing some contrastings forms; berries contrasting with leaf forms; plain spaces with ornamental; straight lines with curved, and so on. The illustrations on pages 92, 93 and 94 show how to plan a design. The main lines of the decoration harmonize with the boundary lines, no matter what shape these may be. Radiating lines are grouped together in each panel, some from a central point, some from the base line, and some from the central line.

A geometrical lay-out for a panel design ensures a certain stable and orderly effect, and if naturalistic forms are used they should be arranged to conform somewhat to the geometrical structure. No attempt should be made to copy natural forms; only conventional representations of natural forms should be used as ornament. The tools and material should in each case determine the manner of treatment.

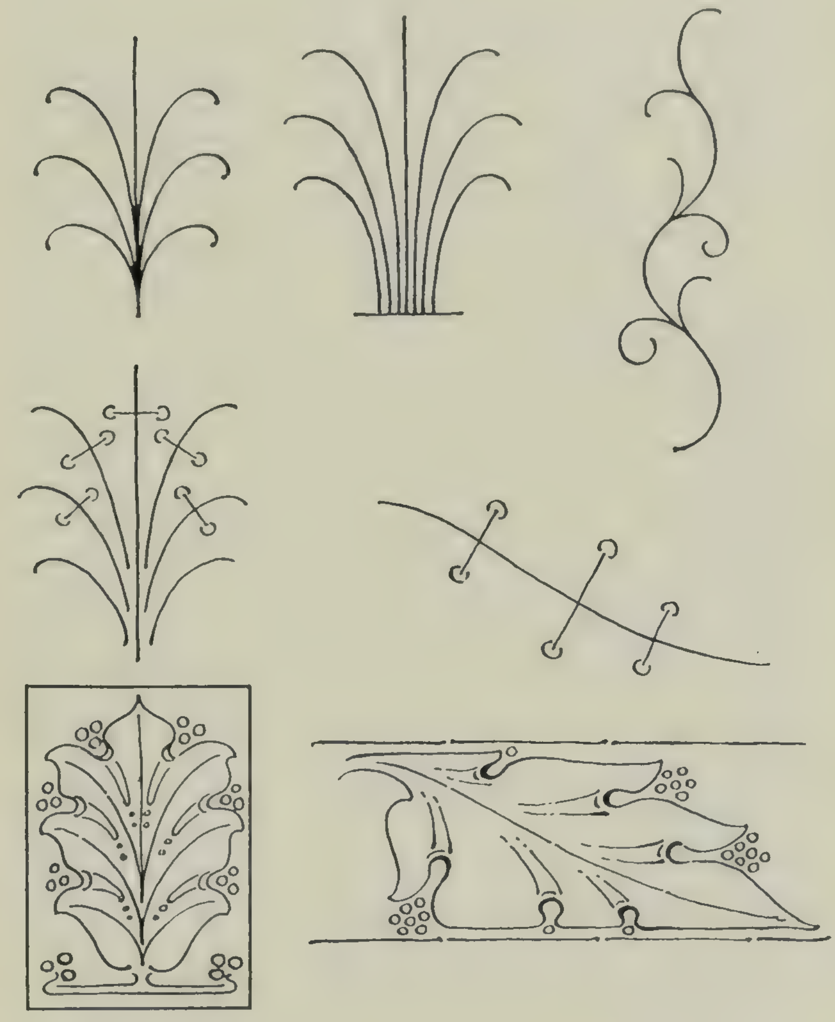
It has been explained in this lesson that the design is for incised work, but if preferred, it may be outlined by punch marks in the manner of 16th century work, and the indentures filled in with a coloured substance. In both cases a satisfactory effect depends almost entirely upon the lines of the ornamentation. The drawing must be good and show a full appreciation of the principle of radiation, together with a working understanding of the forms which the tools can make.

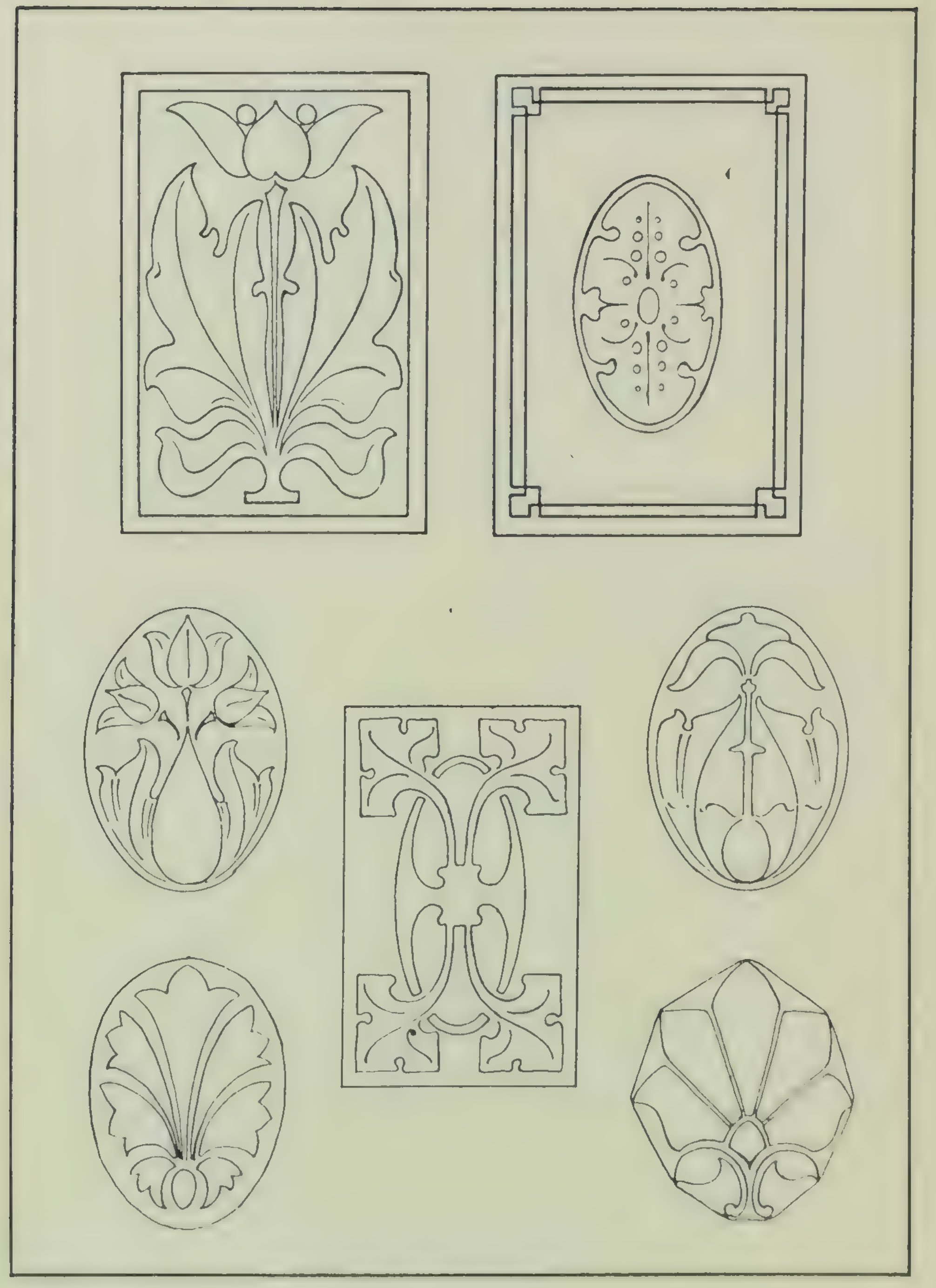
On page 95 is illustrated a 16th century strapwork design for a panel. This is an excellent pattern, very dignified and relieved from monotony by three different enrichments.



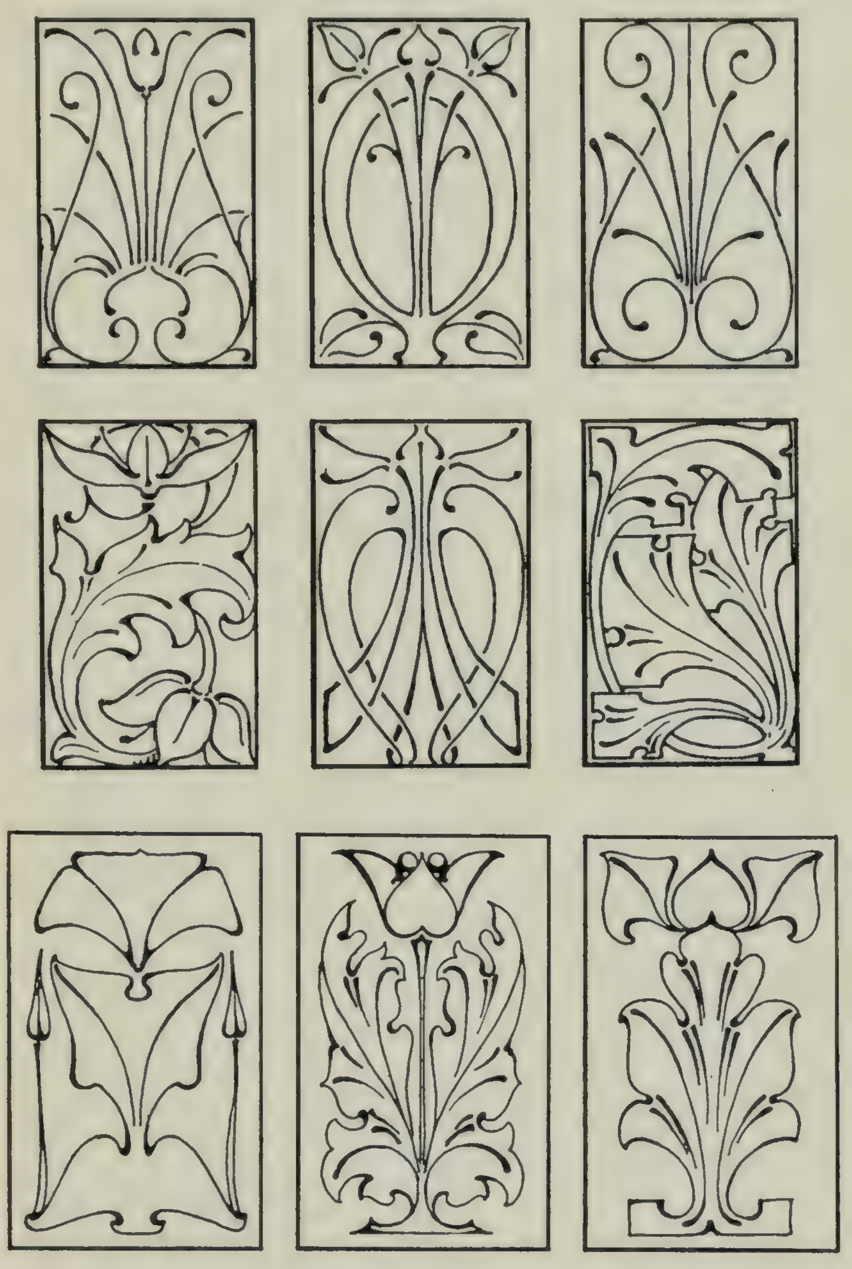
THE PANEL

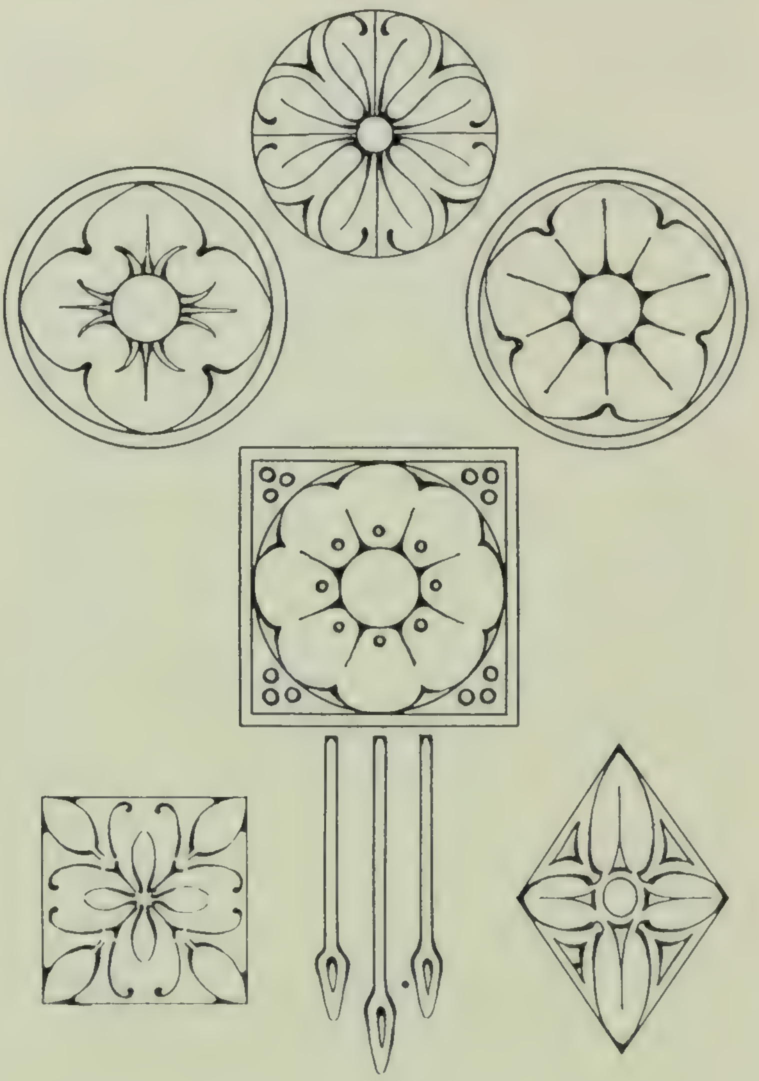
Fundamental elements of patterns are radiating oval curves and contrasting forms for variety.





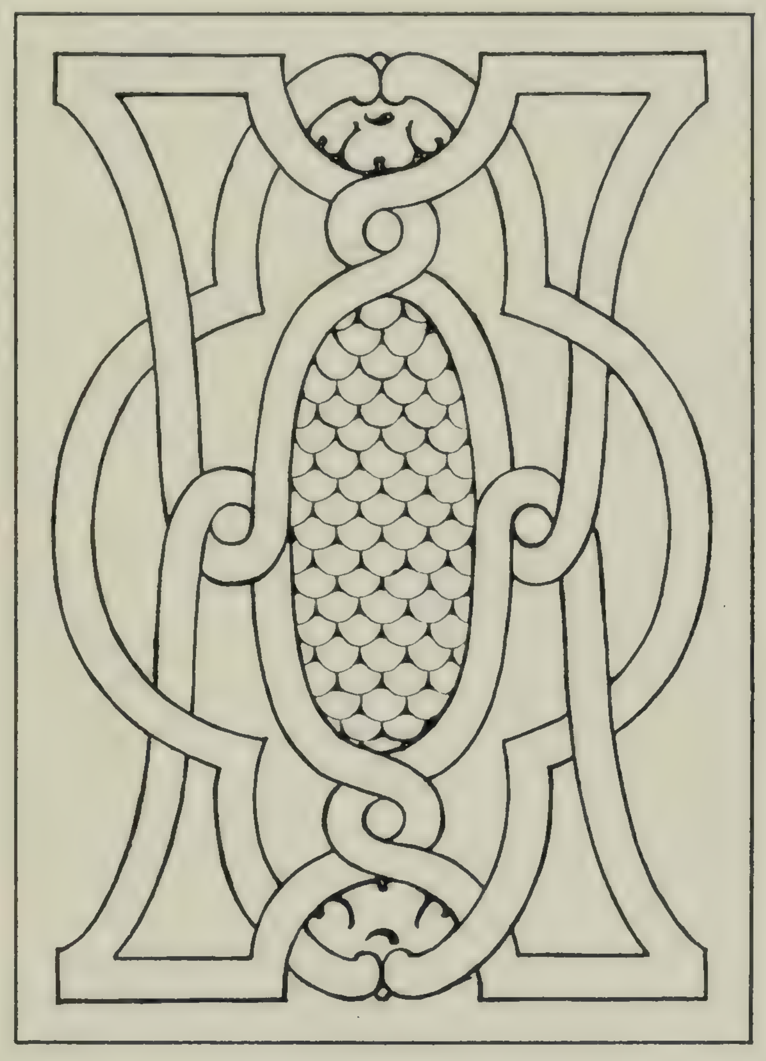
THE PANEL





Showing radiation round a point (The Rosette)

V TOOL DESIGN 16th CENTURY



CHIP-CARVING.

DECORATION made with the chip-carving tools like that made with the veining tool is purely surface decoration and should be clearly distinguished from wood-carving. In the first type the pattern is chipped out of the wood, and in the second it is merely outlined with a line having a V-shaped section. Neither kind of decoration has modelled surfaces which require bold sweeping cuts as in wood-carving proper. Nevertheless, while chip-carving and veining tool work are undoubtedly stepping stones to wood-carving, too much mechanical chip-carving would tend to retard the development of that skill which is required for modelling the surface of decorative wood-carving forms. There are many examples of chip-carving which are a combination of free-hand pattern cutting and chipping, and this type will be found to be the stage of transition between chip-carving and wood-carving.

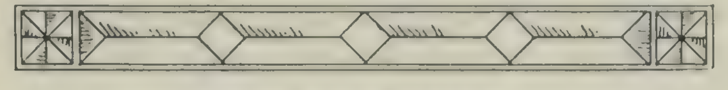
Examples of chip-carving are to be found in museums, dating from very early periods. It has always been a rather popular craft, and was indulged in by primitive peoples when they desired to decorate their domestic utensils and weapons of various kinds. Chip-carving is remarkably suitable for schools because few tools are required, and it can be practised on any kind of table or bench with little confusion. A slight knowledge of geometry is necessary, and before cutting, it is better to work out the designs on paper full size before drawing them on the wood. A woollen cloth should be put on the table to prevent the work from slipping about, but the work should not be fixed, as it is to be continually shifted. Pressure with the left wrist and fingers will keep the wood steady while the cut is being made.

A knife is the only tool necessary for the craft, but a spade chisel is used by many for the purpose. In some European countries the V tool is used in preference to either the knife or spade chisel because it will do in one cut what would take three cuts to execute with the other tool. The V tool, however, is difficult to sharpen and if the pupil has not previously used wood-carving tools, he had better begin with a knife which should always be very sharp.

Chip-carving designs are based on a triangular cut and most geometrical patterns may be easily adapted for the purpose. The most satisfactory woods are kauri-pine, walnut, oak, or teak.

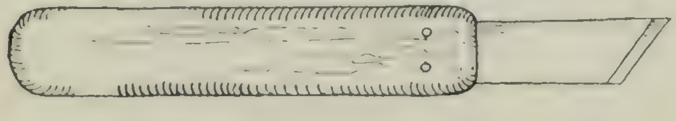
On page 99 may be seen two different kinds of knives which are commonly used for the purpose of cutting—and the illustration will make clear how a decorative unit is developed. The borders on pages 100 and 101 are all drawn in a similar manner. The fundamental geometrical lines of the most complicated pattern will always be found, upon careful examination, to be exceedingly simple.

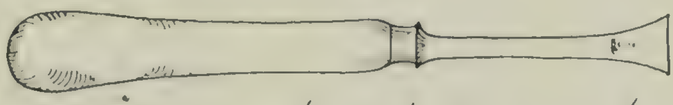
Great care should be taken not to over-decorate or over-enrich the surface. A little chip-carving goes a long way, as it were, and it can be best and most artistically used in combination with V tool work.

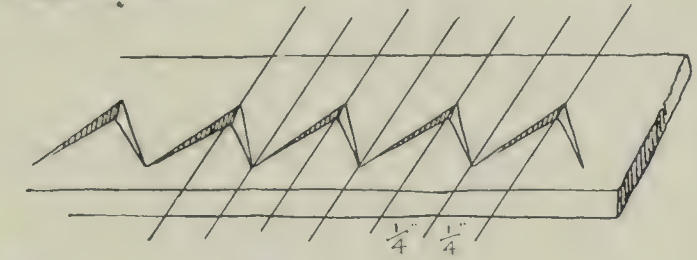


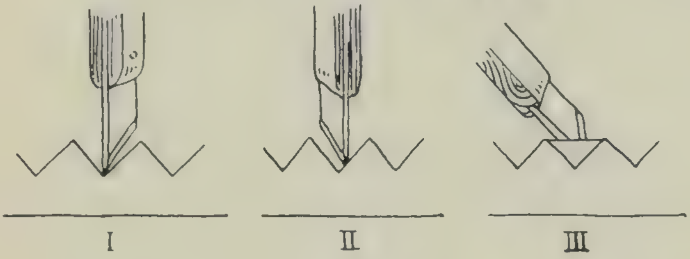
CHIPCARVING

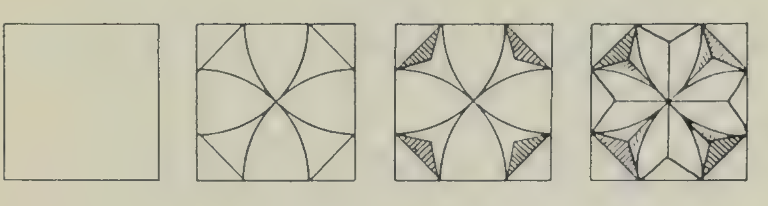
Process of cutting border with knife or with a spade chisel.

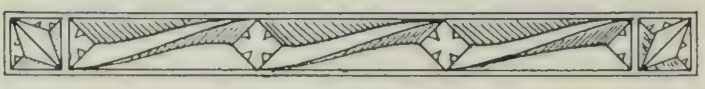








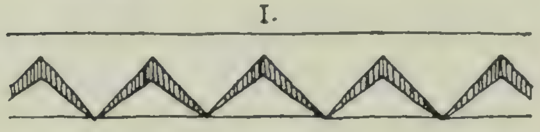




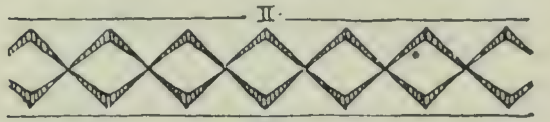
CHIPCARVING

Four different borders composed of the same triangular cut but differently arranged.

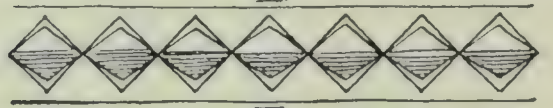
I.



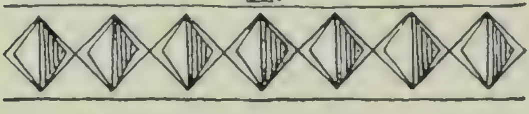
II.

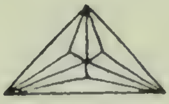


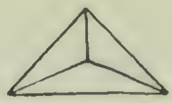
III.

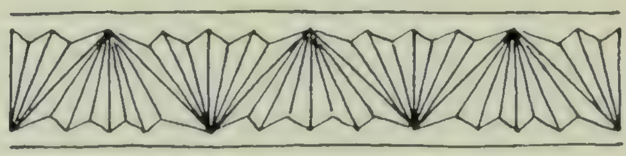


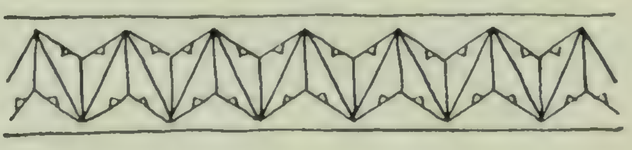
IV.

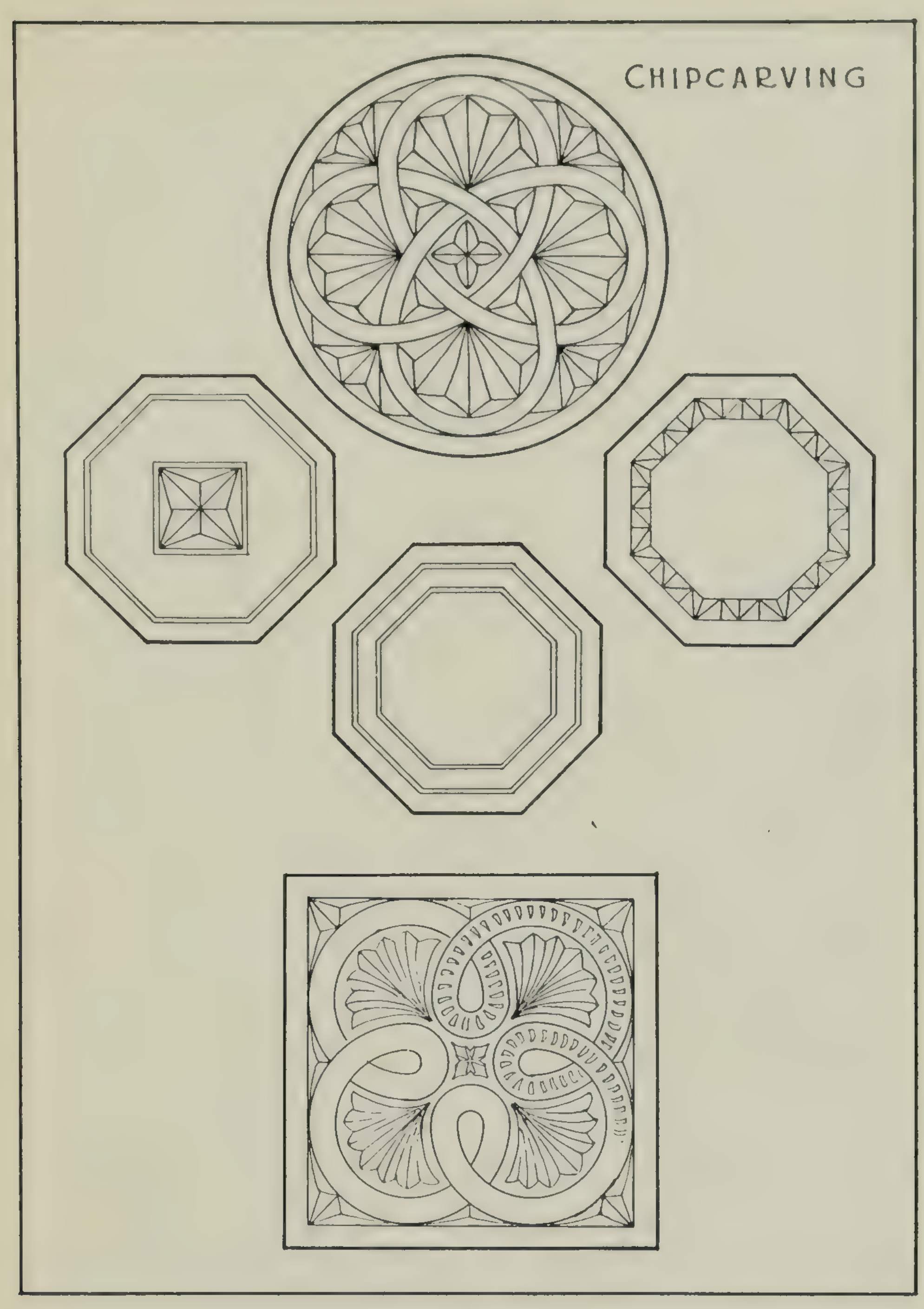












168[illegible]

PROVINCIAL LIBRARY,
VICTORIA, B. C.

WOOD-TURNING.

WOOD-TURNING is work of an interesting and fascinating kind; it therefore appeals readily to boy pupils. The technique in dealing with the quick revolving wood demands considerable concentration of mind and a close correlation of hand and eye action when handling the tools.

To become skilful it is not only necessary to master the wood turning chisels and gouges but also to develop a rare appreciation of correct proportions and beautiful contours. Thus it is, that the principles underlying industrial design should be understood and exercised: then and then only can the wood-turner feel free to model the wood as a potter models his clay, and with sharp gouges and chisels confidently cut the wood away instead of timidly scraping the surface.

For the purpose of gaining this power it is customary to begin the course of wood-turning with certain fundamental cuts such as straight cut, shoulder cut, taper cut, V cut, concave cut, convex cut, and combination cut. In teaching wood turning it is a mistake to be too exacting at first and to so bind the pupil by measurements and restrictions that he is afraid to cut the wood. Certain early exercises to specifically develop freedom may well be given and these should have no restrictions whatever except one which is imperative under all considerations—to hold the tools correctly.

When it comes to designing for this craft the same rules which have been laid down for wood construction will be found applicable; for instance, Rule IV states that in dividing a horizontal primary mass into two vertical subdivisions, the spaces should be equal in area and similar in form.

The horizontal primary mass A, B, C, D, page 106, is divided, therefore, into two equal parts by E, F. Then with a proper appreciation of contours and spacing the wood-turning project can gradually be evolved and finished.

When, however, A, B, C, D, has to be divided into two parts in a vertical position (see page 107) it will be advisable to obey Rule VII which is as follows:—"In dividing a vertical primary mass into two or three horizontal subdivisions, one of the spaces should dominate the other in a correct ratio." It can easily be seen that the equal divisions at A are not so artistic as those at B and C, although the two equal divisions at A are very common. The importance, also, of good contours is very apparent.

When the horizontal primary mass A, B, C, D has to be divided into three vertical parts, as seen on page 106, Rule V should be observed and the central space should dominate the two side spaces. Illustration B shows what to avoid, while C shows what is correct.

When the primary mass is vertical and has to be divided into three horizontal parts the centre division should predominate as seen at D on page 107. But while the spacing is of great importance, the contours are even more so; therefore Rule XIII should haunt the wood-turner, i.e. "For outlines and contours the elliptical or oval curves of beauty should be used which are more subtle, refined, and artistic than the circular." With this idea firmly in mind the wood-turner may keep repeating to himself "It is the curve of the conic section which is required to make elliptical or oval curves of beauty."

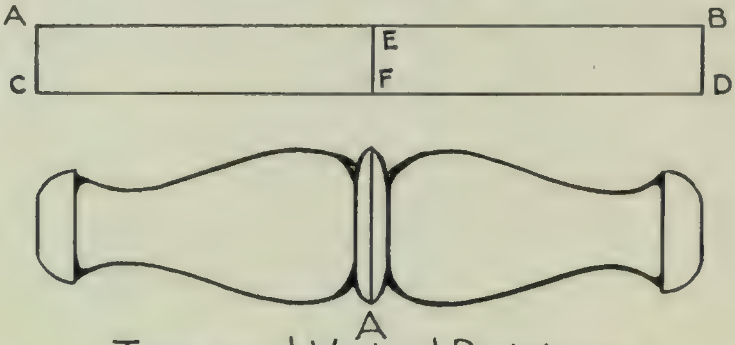
The page of drawer handles at page 108 is interesting because the examples A, B and C, violate Rule II, while D obeys the rule, and the superiority of D to the others can easily be recognized.

Rule II is stated as follows:—"In dividing a horizontal primary mass into two horizontal subdivisions, one of the spaces should dominate the other in a correct ratio." The correct ratio referred to, is one of a subtle type not $1\div1\frac{1}{2}$ but $1\div1\frac{1}{3}$, or slightly more or less than one-third.

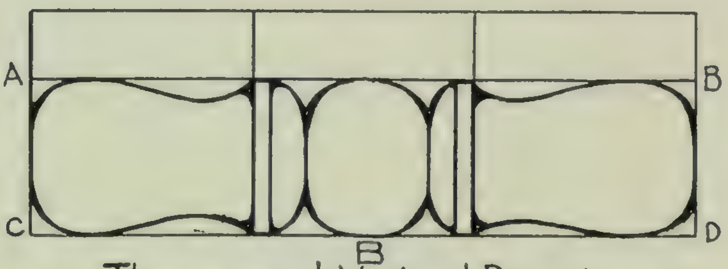
Face-plate turning, examples of which are seen on pages 109 and 110, demands competent judgment and a thorough acquaintance with the rules of design. Clumsy effects are more common than those of an artistic nature, and yet the amount of time and labour spent on the project is usually the same in each case—knowledge must work with skill in order that the best effect may be obtained.

The two examples, A and C, on page 110 show how Rule VII has been violated whereby the primary mass has been divided into two equal horizontal subdivisions. The improvement at B and D where the proportions have been rectified cannot fail to be apparent.

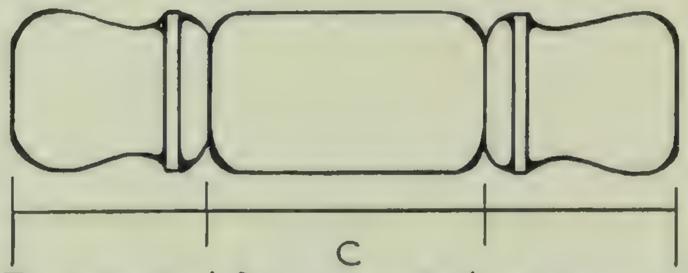
WOOD-TURNING COMBINATION CUTS



Two equal Vertical Divisions
Obeying Rule IV

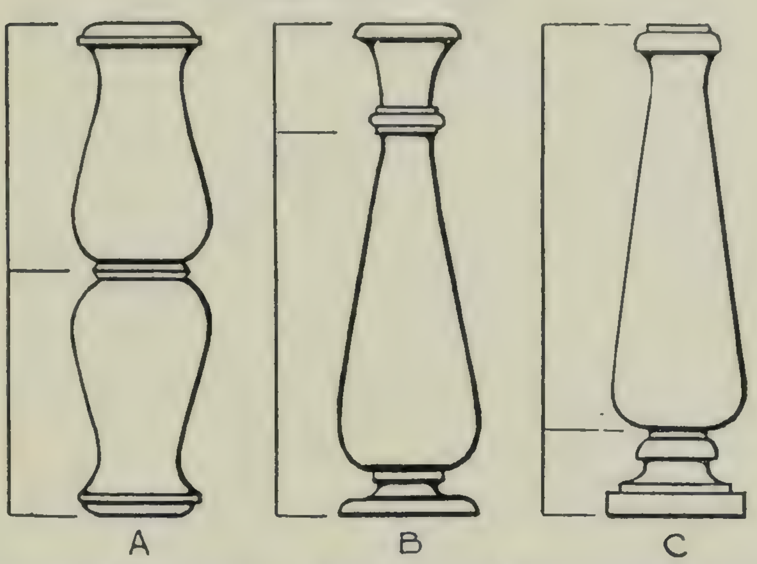


Three equal Vertical Divisions
Disregarding Rule V.



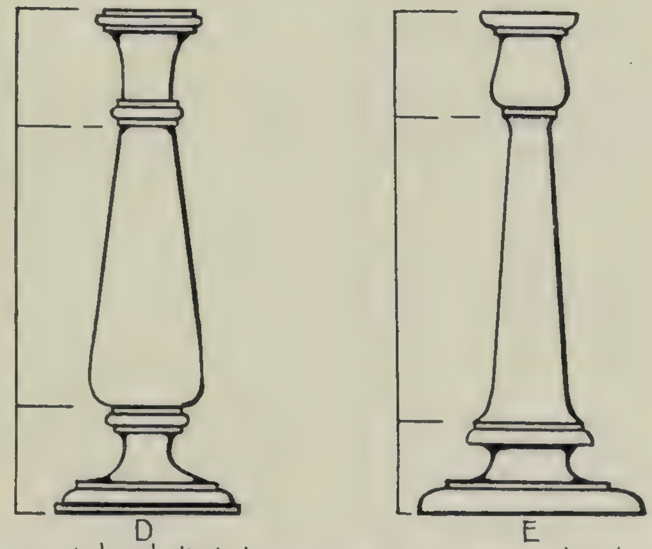
Three Vertical Divisions - Centre predominant.
Obeying Rule V.

WOOD TURNING



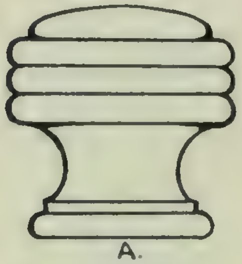
Two equal horizontal divisions
Poor.

Two unequal horizontal divisions
Obeying Rule VI.

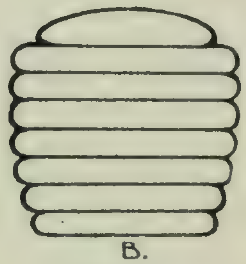


Three horizontal subdivisions, one space predominating
Obeying Rule VII.

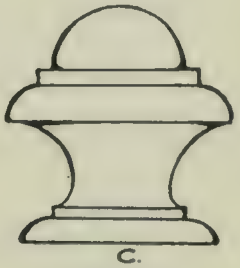
WOOD TURNING (DRAWER PULLS)



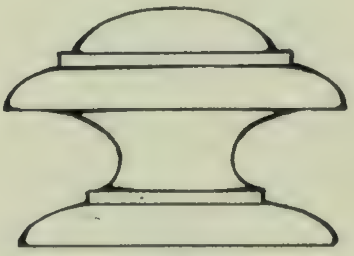
A.
Horizontal
Two equal divisions



B.
Equality and
Monotony

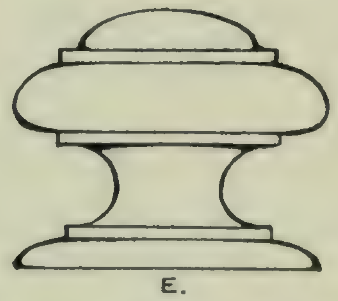


C.
Two equal
horizontal divisions



D.

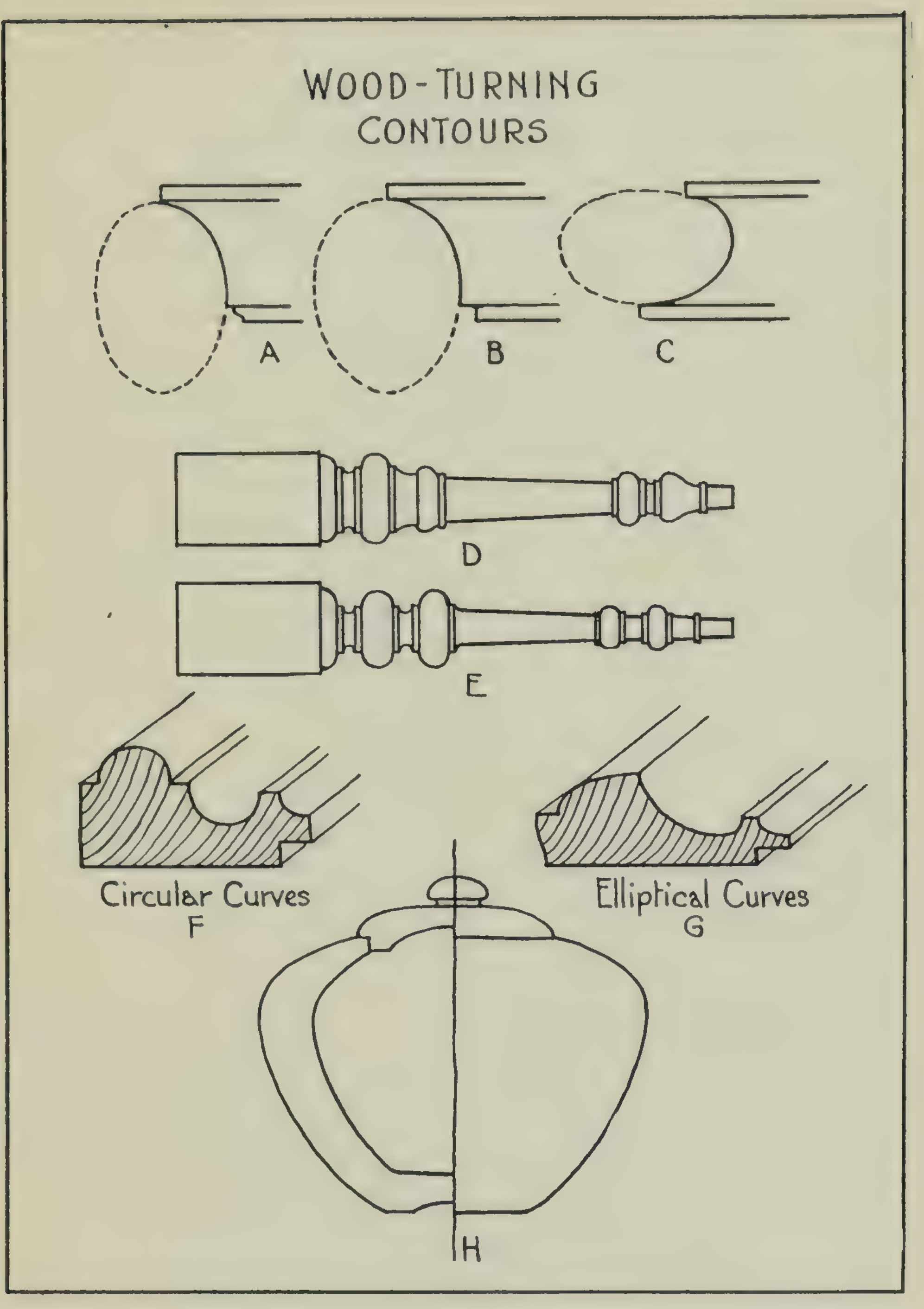
Two unequal horizontal
divisions showing variety



E.

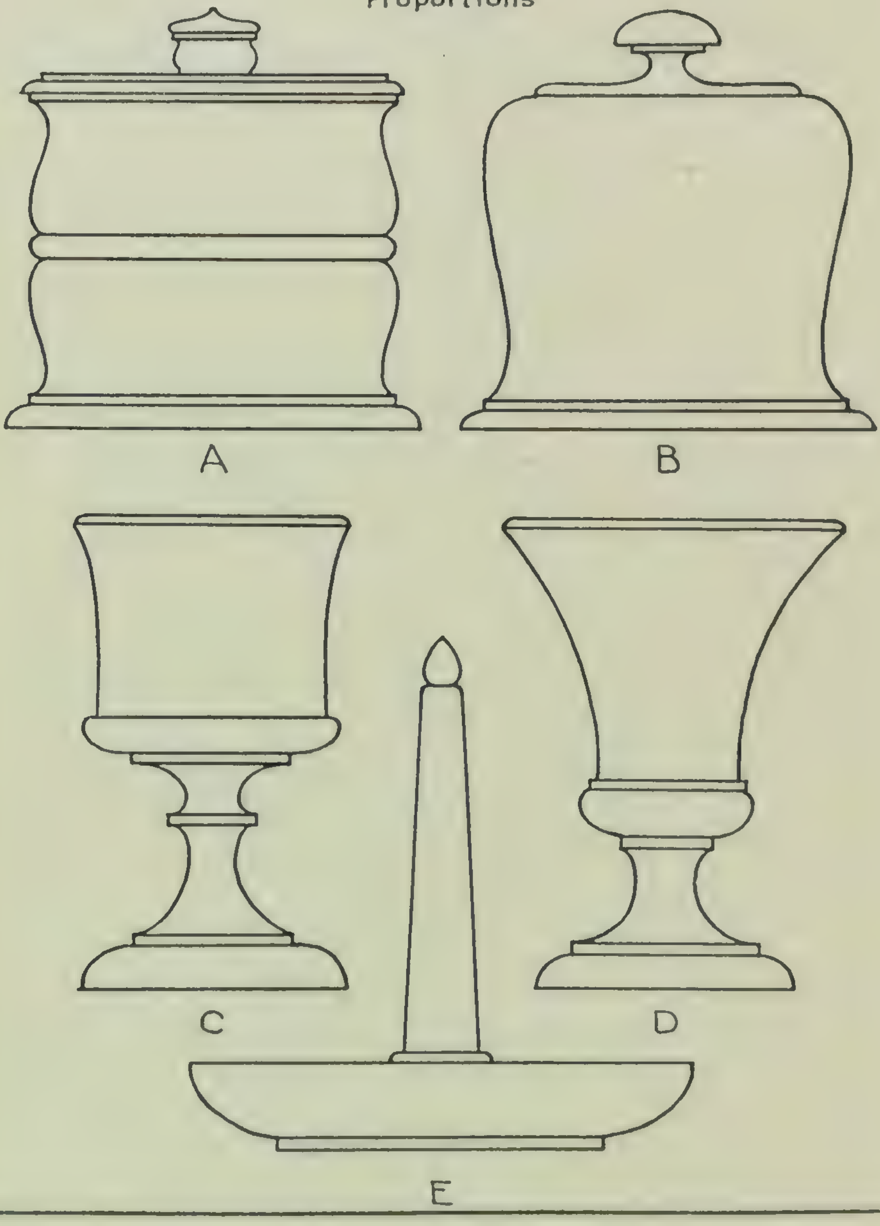
Two unequal horizontal
divisions showing variety

Rule II In dividing a horizontal primary mass into two horizontal subdivisions, one of the spaces should dominate the other in a correct ratio.


WOOD-TURNING CONTOURS

WOOD TURNING

Contours
and
Proportions



STAINED WOODWORK.

IT has been already asserted that the safest artistic method of decorating woodwork is to do so with the aid of woodworking tools; thus chip-carving, incising, low and high relief carving, and wood-inlay are all absolutely sound methods.

Yet, with all those methods of decoration, it is possible to stray far from the path of true artistic principles and to place high relief carving on flat tables, and on places which reduces the utility of the object, or make wood inlays to represent realistic pictorial subjects and imitate relief with shading and colouring, and in many other ways to violate the principles of design.

The custom which has been practised from time to time, of adding colour to wood by either painting or staining, is quite permissible. Colour prevents monotony in interior decoration. Very little technique is required, but a great deal of knowledge and refinement in order to successfully guard against vulgarity. See page 115.

The materials necessary for coloured woodwork are a few paint brushes, a clean cloth, glass paper No. O grade, stains (either spirit or water) for oak, walnut, mahogany, ebony, etc. Water colours or waterproof India inks may also be used to great advantage. The design should be prepared on paper ready for transferring.

For very fine effects in staining, the quality of the wood is important; maple, chestnut, and sycamore being the best; but it is not necessary to be so particular if painting is resorted to. Splendid results are obtained on the three-ply or laminated woods of British Columbia.

It has been a fashionable hobby on more than one occasion, to stain objects made of sycamore or maple, and to endeavour to imitate real inlay. The inlays of the Louis periods and of Hepplewhite and Adams were wont to be faithfully copied and paraded under the nom-de-plume of Marqueterie work.

The wood is first sand-papered with No. 1 paper and finished with No. 0. The rubbing down must be done straight with the grain of the wood. The pressure should be equal throughout; otherwise the glass paper will only scratch the wood and leave marks. This remark does not apply to end grain wood which requires rubbing, both across and with the grain.

Next trace on the design, using lead paper instead of the usual carbon paper. Most wood stains should stand for a few hours in order that some evaporation may take place, thus denser and darker colours may be obtained.

The wood should now be coated with gluesize or gelatine to fill up the grain. The sizing prevents the colours from sinking into the wood; it binds the colours and prevents them running into each other. Nevertheless, stains have often to be mixed; for instance, it is a good plan to enrich some greens by adding a little satinwood, or if the green must be toned down, to mix a little walnut with it.

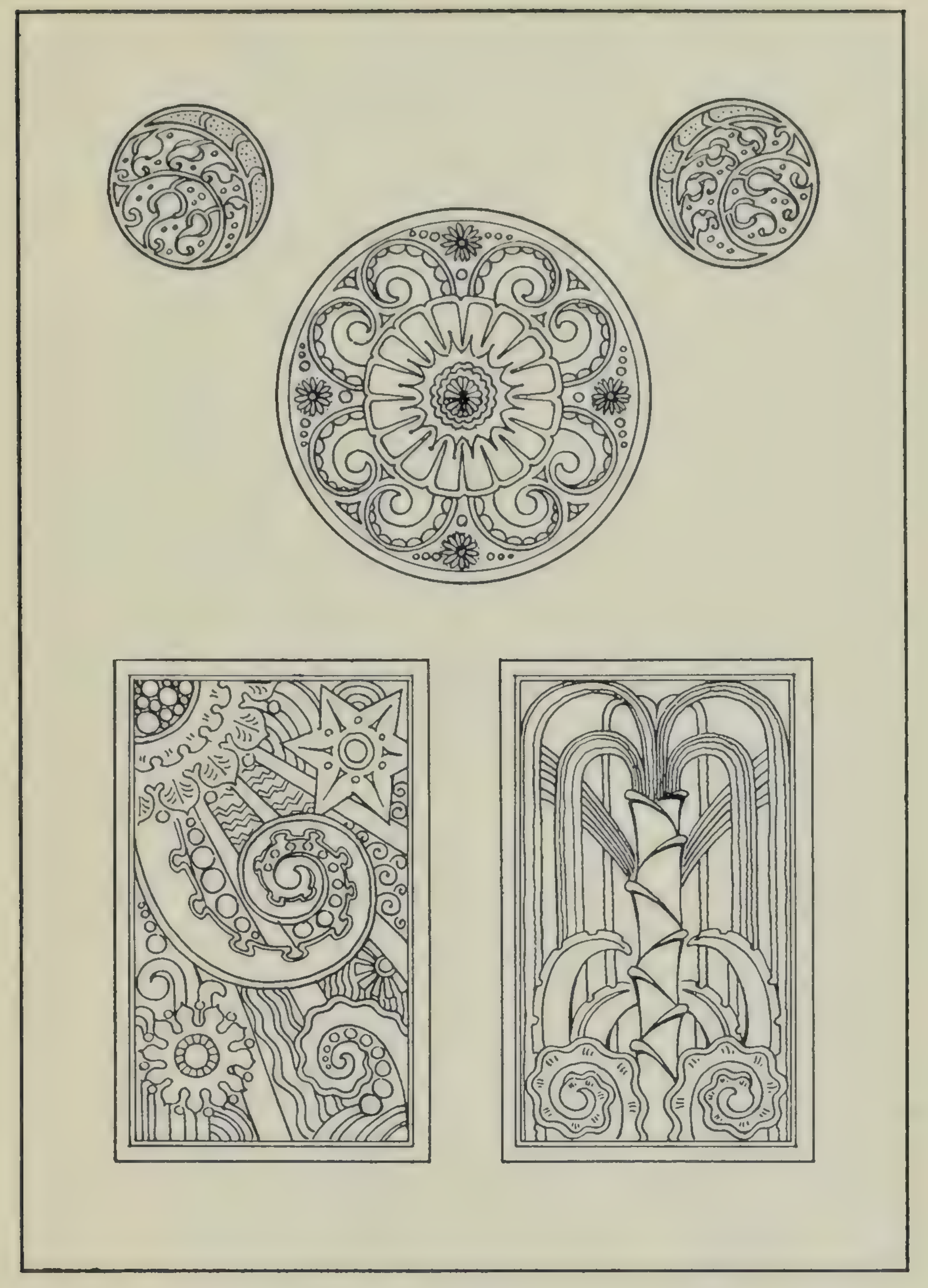
Sometimes, also, it is necessary to add two or three coats to gain the desired shade. Experience will show which stains cover well and can stand polish, and which stains sink in the process of polishing. In staining large surfaces it is well to flow the stain on with a large brush.

A coat of white shellac and a rub with wax polish will give a good finish, but French polishing is often preferred. After the decorated work has had a few days to dry, it should receive a coat of white spirit varnish, applied thinly, flatly and evenly with a camel hair varnish brush. The work should now be set aside for a day or so until the varnished surface is perfectly hard. Prepare a rubber for polishing by wrapping some cotton wool with a piece of soft linen: the cotton wool should be saturated with French polish and the linen drawn tightly over it and held in the hand.

A drop of linseed oil placed on the pad will prevent the pad from sticking and the colour from lifting. Great care, however, should be exercised not to put too much oil on, that the surface may not be greasy. There should just be sufficient to allow the pad to slide freely over the surface. The rubbing should be done in circles and when a fair surface appears on the polished article, it may be set aside for a day or so in a place free from dust until the coating hardens.

Make a new pad for each day's rubbing, or keep the old pad in an air-tight can to keep it moist; saturate it well in polish as before, and repeat the process; before setting the work aside apply a few drops of methylated spirits to the face of the pad and work it lightly over the surface; this will remove all unevenness and greasiness caused by the oil. The spirits ought only to be applied at the end of the second and third rubbings and finally.

Each rubbing should take about half an hour and the final rubbing with spirits, about fifteen minutes. French polishing is an art which requires a sense of touch, because it is easy to allow the pad to stick to the surface and easy also to allow the spirits to lift the polish. The polishing should be done in a warm room and the surface allowed to harden for a few days.



GESSO WORK.

ITALY is the true home of Gesso decoration, where its application is seen on furniture, painted and gilt in a remarkably rich style. It is also found united with painting and forming the background of devotional pictures of the early Italian School, and used for diapered backgrounds and gilded enrichments of all kinds. Marriage coffers of the same period may be seen in all the principal museums showing figures in relief, and patterns raised and gilded with rich ornamental effect. Gesso is also found underneath the burnished gold work of the mediaeval illuminator, and it enabled him to give that rich and sparkling effect which is characteristic of English and French fourteenth-century manuscript.

There are many recipes for gesso; these vary according to the type of work which has to be carried out. For small work on wood the following will be found satisfactory:—

1	tablespoon	powdered resin.
4	"	linseed oil.
6	"	liquid glue.

Mix well and boil in double boiler for ten minutes. Soak ten tablespoons of whiting in cold water and add to the above mixture until it has the consistency of cream, and is thin enough to flow freely from the brush and build itself up, but not so thin as to overflow the pattern.

If the design has to decorate a wooden panel it should first receive a coat of shellac. Then having traced the design on the panel, lay on the gesso with a long-haired sable brush (a rigger). The brush should be held as perpendicular as possible so as to favour precision and clearness of touch.

Yellow ochre mixed with gesso gives it a fine ivory colour and a little glycerine added to the preparation helps to keep it fluid and prevents cracking. For high-relief the gesso is applied in coats: as soon as one becomes tacky the next is applied. When thoroughly dry the gesso work may be coated with beeswax dissolved in turpentine or with ordinary floor wax, and then polished. This gives a creamy colour and hardens the surface. Oil colour floated on with turpentine or oil colour mixed with beeswax and turpentine can be applied, and a delightful effect is obtained by wiping the high lights with a soft rag.

The ultimate appearance of successful gesso work should give an impression of having been executed with the brush and therefore it should be smooth and textureless. It is possible to model gesso with the fingers and even carve it when dry, but this treatment detracts from the special character of the work and should be avoided.

It will be observed how similar are the brush forms for gesso work and those which are appropriate for stencilling. The same underlying principles of design will be found to exist, inasmuch as radiating forms and contours having elliptical curves are always most satisfactory in both gesso work and stencilling. In doing gesso work the brush should be full of material and held rather upright. Blob forms can thus be made naturally; therefore the designs should be made with this in view. Full advantage should always be taken of what can be made naturally. By this blobbing on the gesso, forms can be heightened indefinitely, and contrasts between leaf forms and berry forms will always be satisfactory. This may be noted on pages 120 to 126.

In making designs for stencilling and gesso work, Rules XIII, XIV, and XV should be understood; they are therefore reprinted here:—

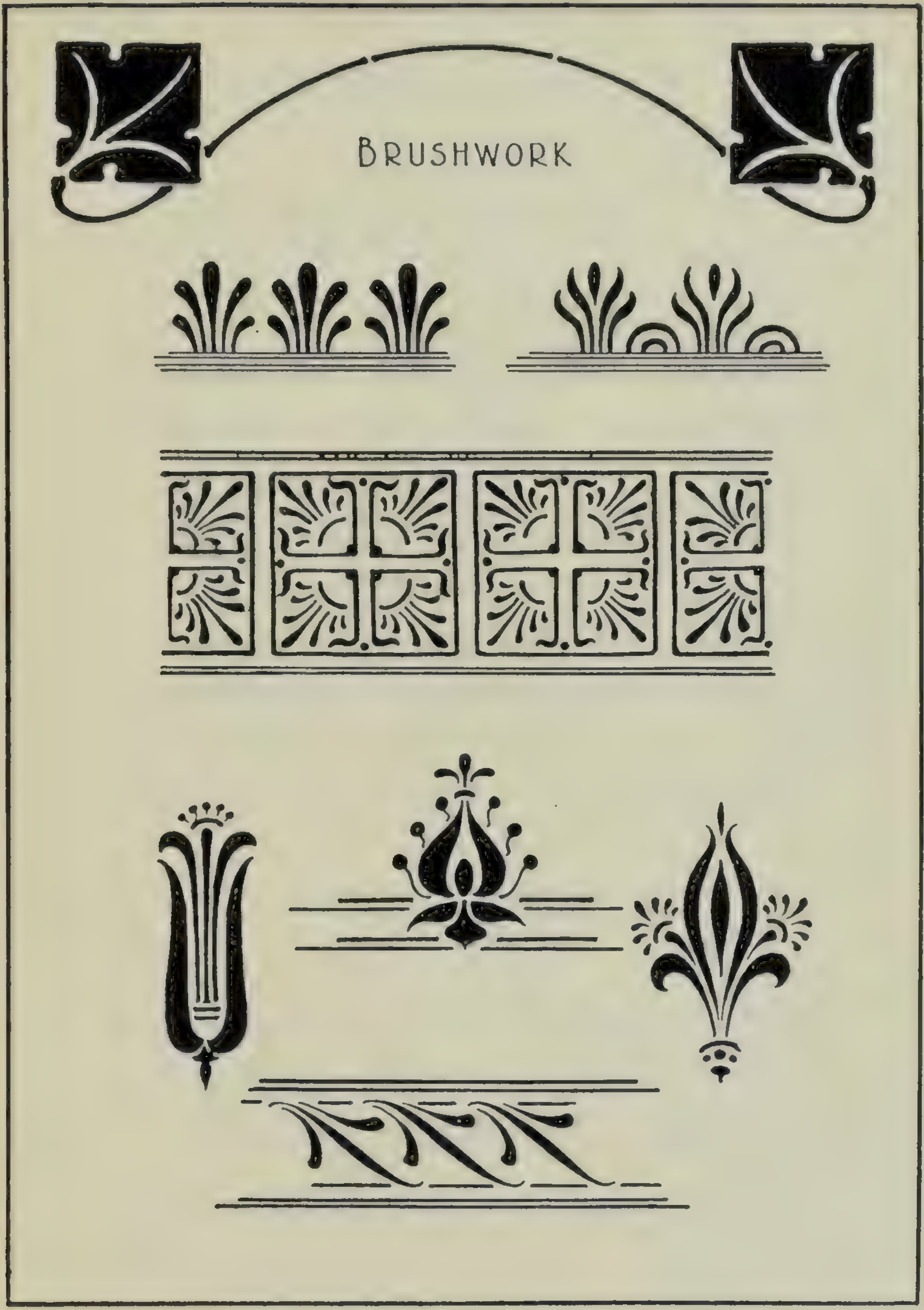
> *Rule XIII*—For outlines and contours the elliptical or oval curves of beauty should be used, which are more subtle, refined and artistic than the circular.
>
> *Rule XIV*—The border should first have a correct proportion in relation to the panel. Decorations should be made by the repetition of varying forms to prevent monotony.

Rule XV—The panel should first have correct proportions and may be decorated by radiating lines and varying forms which should emphasize and harmonize with the shape of the panel.

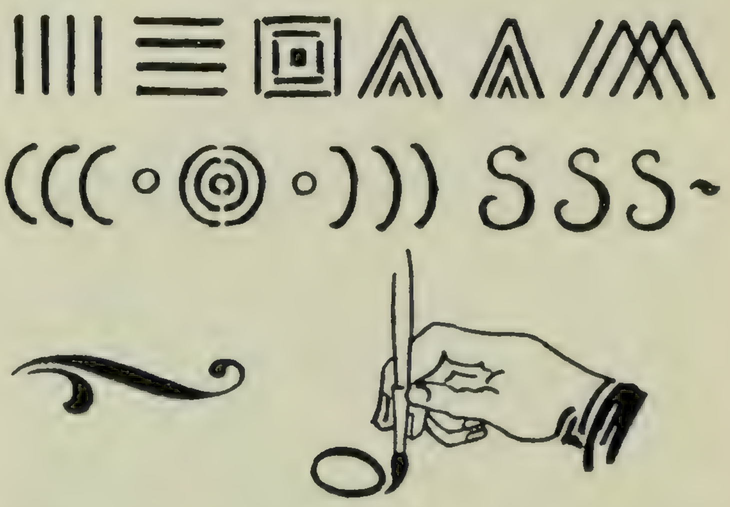
For white wood articles suitable for gesso decoration the firm of Smith, Mauchline, Scotland, will be found to be the best.

GESSO-WORK.

BRUSHWORK



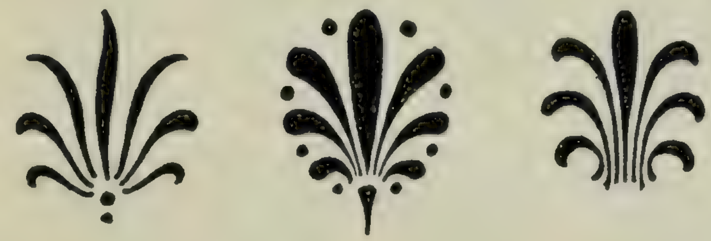
BRUSH LETTERING

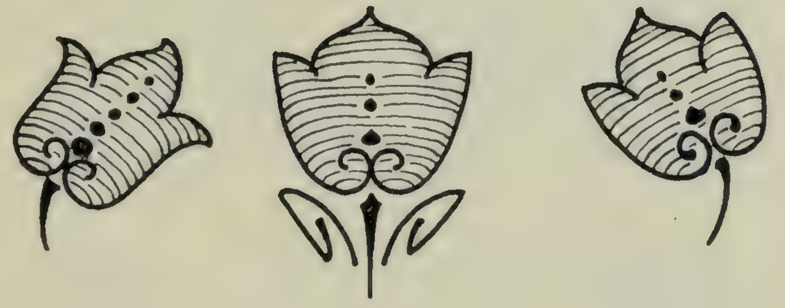


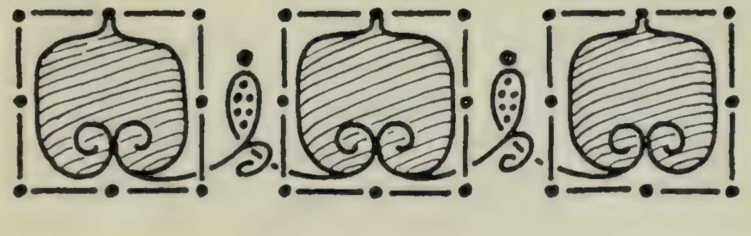
ABCDEFGHIJK
LMNOPQRSTUV
WXYZ

abcdefghijkmnop
qrstuvwxyz

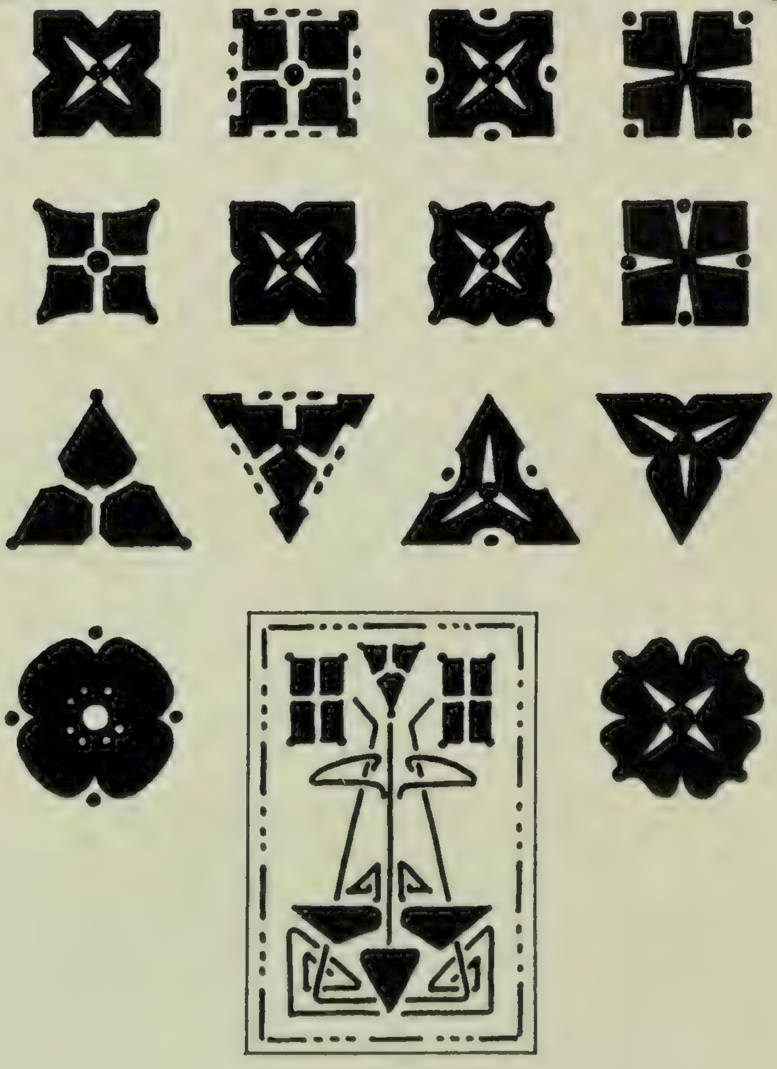
GESSO-BRUSH FORMS







GESSO-ROSETTE FORMS

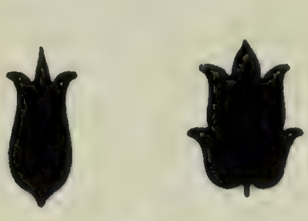


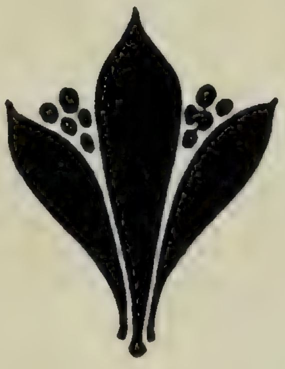
GESSO-BRUSH FORMS

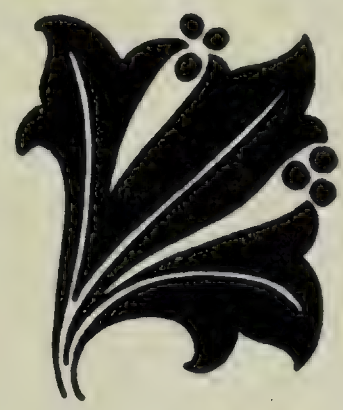
I

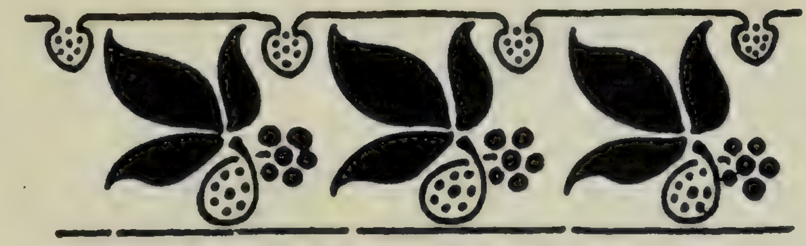
II

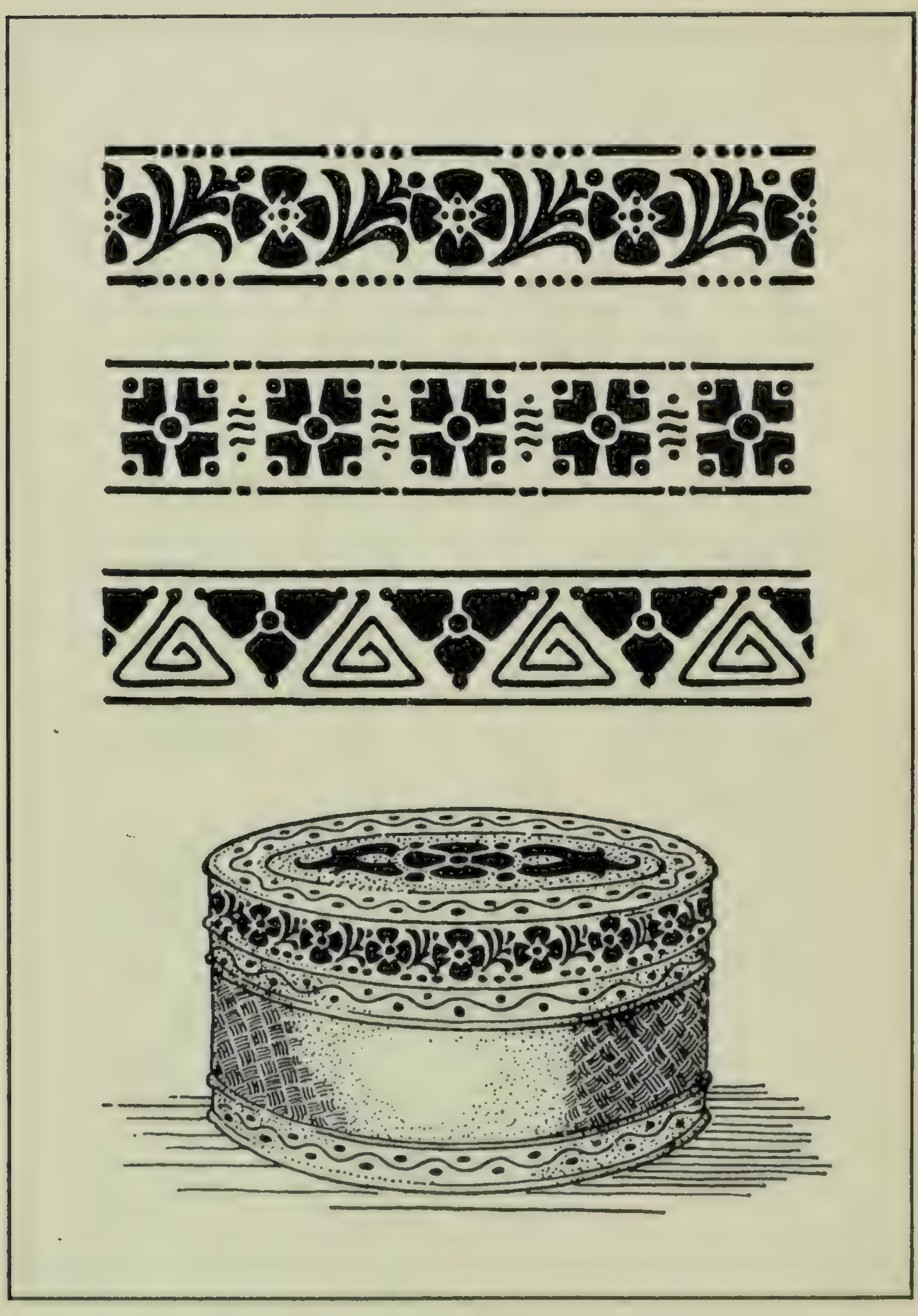
III











STENCILLING.

STENCILLING as a means of decoration must have been known to ancient peoples long before the classic days of Greece and Rome—it is even used by certain primitive peoples to-day who make stencils out of bark and other common material for repeating their decorative forms to cover a surface or to make ornamental bands or borders.

Because stencilling is a good means of repeating motifs, one should remember that designs for such a purpose should be simple and inclined to be abstract; in fact it is a law of design that the more severe the design the better will it bear repetition. The simple and abstract egg and dart pattern of the Greeks for instance, is infinitely more satisfactory when repeated than it would be were the motif naturalistic in treatment. The nearer the ornament approaches nature the less suitable it is for repetition.

Stencilling is also an excellent means for students to apply their designs because in a measure, the treatment compels them to adopt a decorative creation as a motif. The forms when stencilled have naturally a flat effect. Even when the colour is broken by stippling one colour over another, the ornament does not lose this flat feeling. Without doubt stencilling is the most useful means afforded the designer to apply his knowledge of ornamentation, but although this is so, stencilling is, to a great extent, a neglected craft among decorators.

Stencils may be used for an endless number of purposes. They may be used directly on walls and ceilings or may be printed on wall coverings or canvas and hung afterwards. Whichever way is adopted, stencilling as a craft is essentially one for the decorator. There is a fine opportunity also for experimentation with thick colours, transparent glazes and metallic materials of every kind.

It is possible to stencil on almost any material. Oil or tempera colours should be used on wood; but if oil colours are used on fabrics, as much oil as possible should be extracted from the colour by using common brown paper or blotting paper as a palette. A special colour for fabrics may also be purchased. Tempera and water colours or powdered colours and metallic powders mixed with gum arabic may be stencilled on paper.

In cutting stencils it will soon be found that radiating lines and curves are the most natural forms for the knife. Such radiating lines have a good effect because they are more orderly and dignified; they also lend themselves to forming ties.

Ties are indispensable to stencil plates; they hold the design together, but it is imperative that the ties form part of the design; they should curve with the forms and not oppose the constructive lines at right angles.

No attempt should be made to hide them; they should be frankly recognized because it is the ties which give the stencil design its strong, flat, decorative character. They give the same effect to stencil patterns that lead lines give to stained glass designs. The stencil designer should admit this fact from the beginning, and make his design accordingly.

Stencil-plate cutting should be done on glass or zinc; the cleanest cut will be obtained from glass, but the knife quickly becomes blunt. It may be kept sharp, however, by rubbing it at intervals on a piece of No. 0 emery paper and this will enable desirable cutting to be done with one stroke of the knife.

Stencil-plates may be made of various materials, a selection from which will depend entirely on the amount of work which has to be done with them. Ordinarily, cartridge paper may be used for the cutting plate, provided it is first treated with boiled linseed oil, or ordinary knotting. This knotting is used by painters to brush over wood knots before painting so that the knots will not bleed. Cardboard, zinc, copper and other metals are all used as stencil-plates.

Colour is stippled through the openings cut in the stencil-plate to the material which has to be decorated. For this purpose stencil brushes are used (Nos. 0 and 3 will be found suitable for beginners) and the term stippled should be noted because the colour is not brushed through the openings of the stencil-plate. If it is difficult to procure special stencil brushes, use ordinary hog-hair paint brushes and wind string around the bristles to make them shorter and more suitable for stippling. When the paint finds its way underneath the stencil-plate it may be concluded that the paint is too wet or else the plate has not been held down firmly enough on the material, or the design may be too delicate for the material.

If the material to be stencilled is a fabric it should be pinned tightly over some sheets of blotting paper or over several layers of newspaper. The colour should then be stippled through the open spaces with a stencil brush. A separate brush should be kept for each colour, and one of the charms is the easy way in which colours may be varied and graduated from blues to greens and purples or from yellow to orange or red to violet.

In stencilling fabrics which have to be washed the following mixture will prove an effective mordant:—

3 oz. turpentine.
10 to 12 drops vinegar.
4 to 6 drops lemon extract.

It is better to stencil with a brush rather too dry than overcharged. Less colour should be used on fine surfaces than on coarse, and the best effect is obtained by careful stippling. Hurried work usually looks crude and worthless. When stencilling, use a piece of paper in the free hand to protect the part that is not to receive colour. Stencil-plates should be cleaned immediately after use with a cloth damped with coal-oil or turpentine, also cleaned when reversing the stencil for a repeat. Lay the stencil on blotting-paper or newspaper when cleaning, and dry carefully.

Stencils may be grouped in two classes; those known as negative or background stencils; the other as positive or ordinary stencils. Designs may also be carried out with two, three or more stencil-plates, but great care must be exercised to register them exactly so that they may fit when superimposed.

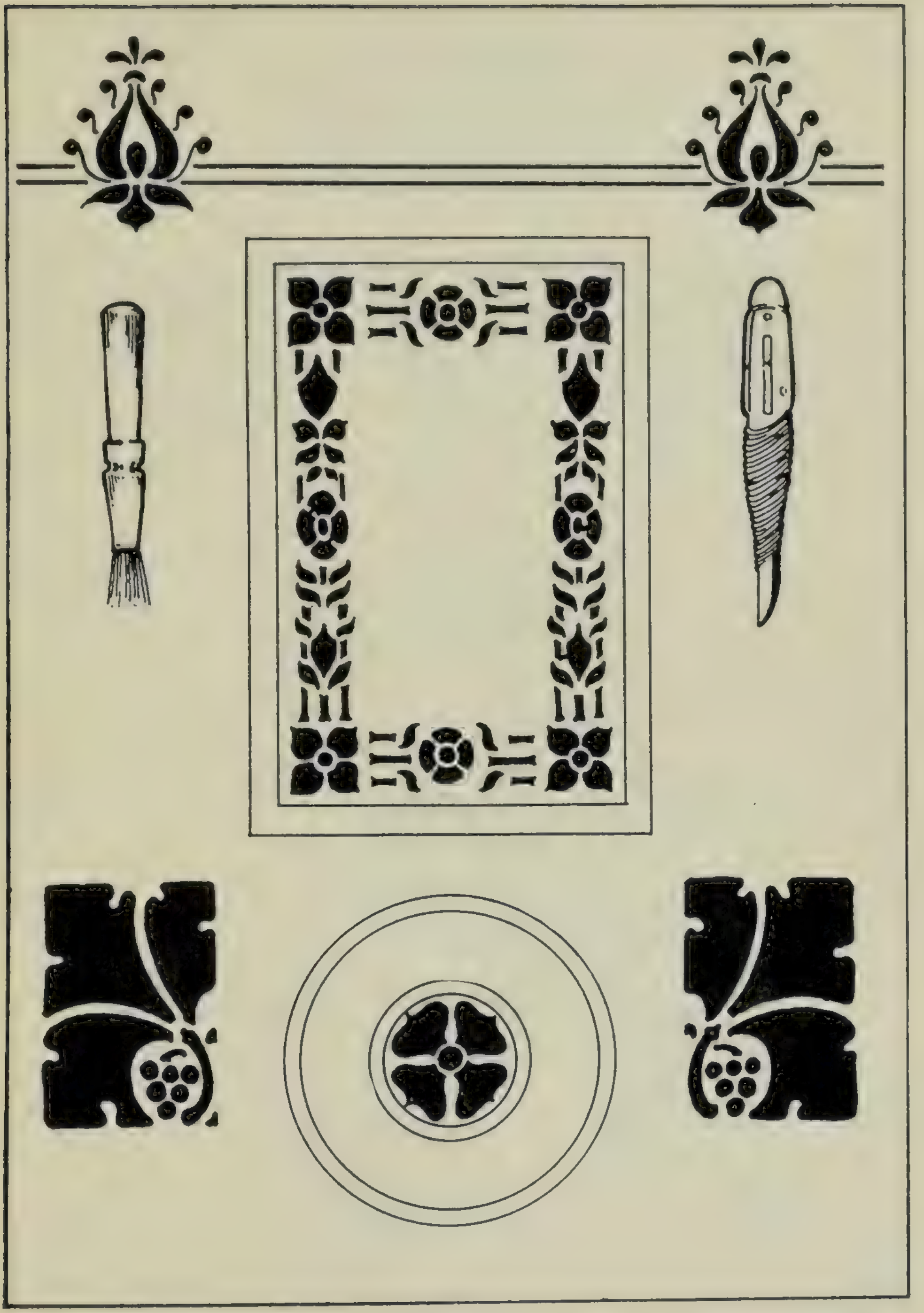
Pages 133 to 136 show some examples of stencilling to illustrate how the forms may be treated simply and decoratively, and how large masses are made to contrast with those of a smaller character. It should also be noted how the principle of radiation is obeyed, and how elliptical contours and the simplification of natural forms are the primary essentials in successful stencil designing.

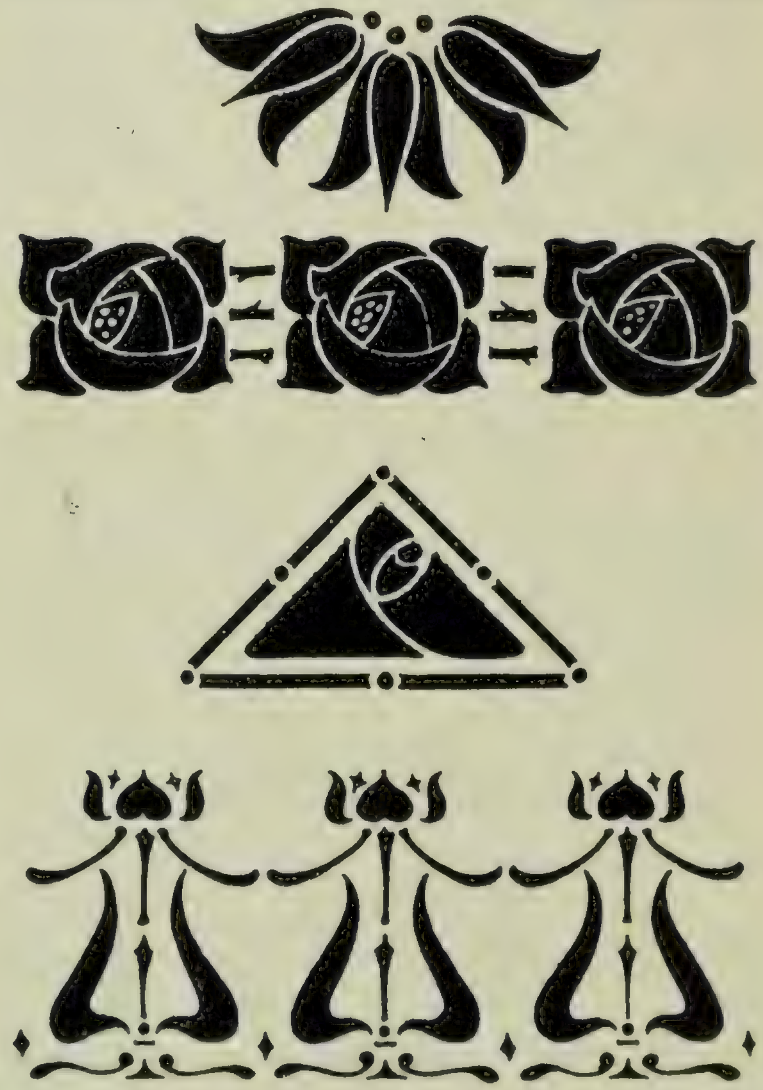
Observe on page 133 the ordinary pocket-knife wrapped round with string; such a knife will cut just as well as a special stencil-cutting knife.* An ordinary hog-hair brush treated in the same way but with the bristles left sufficiently long for stippling on the colour, is an excellent substitute for a stencil brush.

In all the examples given the ties will be found to harmonize with the forms; they are not placed in antagonistic positions. It is most important in lettering to observe this rule and on page 136 there are two alphabets which are very successfully treated; the spaces do not in any way detract from the legibility of the letters.

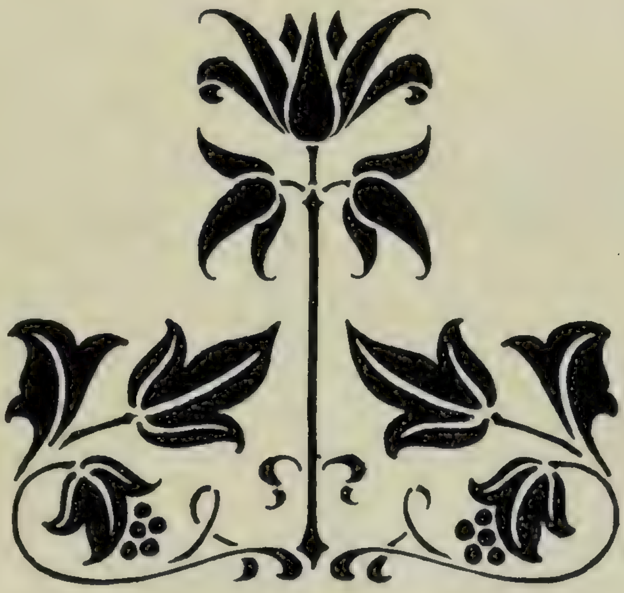
---

*A good and cheap stencil knife is made by Henry Mitchell, Birmingham, England.





STENCILS



STENCILLING

STENCILLED LETTERING